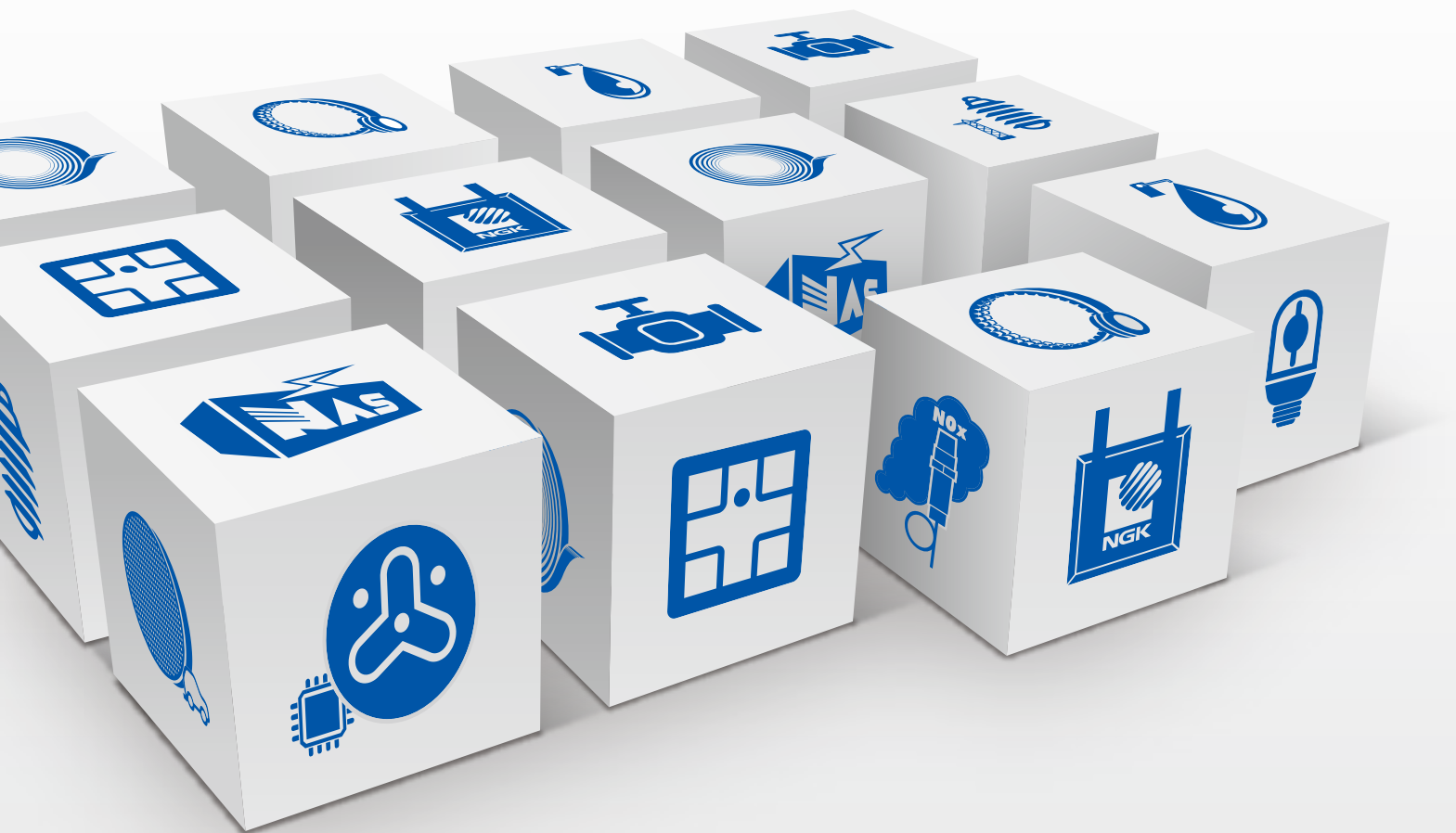


SINCE
1919
YEARS



NGK INSULATORS, LTD.

NGK Sustainability Data Book 2018



Offering Unique Ceramics Technology to Provide Society with New Value

Here at the NGK Group, we seek to harness the strengths of our core ceramic technologies to pursue opportunities in the energy, ecology, and electronics sectors. Through our activities relating to power supply, ceramics, electronics and process technology, we strive to meet the ever-changing needs of society.

Editorial Policy

The NGK Sustainability Data Book 2018 reports details of the NGK Group's ESG information. Stakeholders can find information on what strengths the NGK Group has to offer, how we are creating value, how we plan to grow further, and how we are contributing to sustainable development of society and the entire world in the NGK Report 2018.

Target Organization Indicated along with each article and data report included in this report.

Target Period April 1, 2017 to March 31, 2018

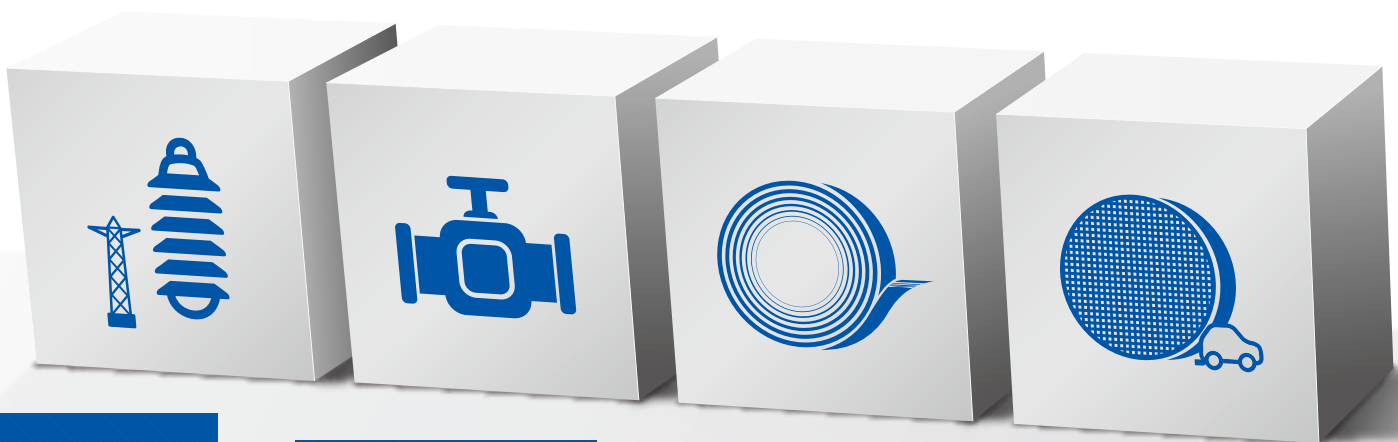
Forward-Looking Statements

This report includes forward-looking statements, such as business forecasts, concerning the NGK Group. Such statements are based on currently available information and reasonable assumptions and projections. However, please note that these assumptions and projections may be affected by various future factors, causing actual results to differ from the presented statements.

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Our Main Products



Insulators

Insulators support power transmission wires, ensuring that transmission lines and steel towers and equipment are completely isolated. Backed by uncompromising quality and advanced technology, our products continue to make power supply safe and reliable.

Industrial machinery and devices

The breadth of NGK technologies, which were honed over long years of experience in producing ceramics, allows us to provide industrial machinery and devices in a wide range of fields, from kilns to pumps and valves and even low-level radioactive waste treatment systems.

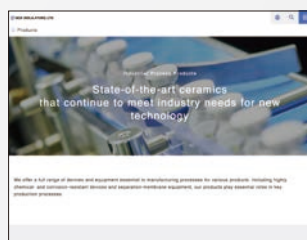
Beryllium copper

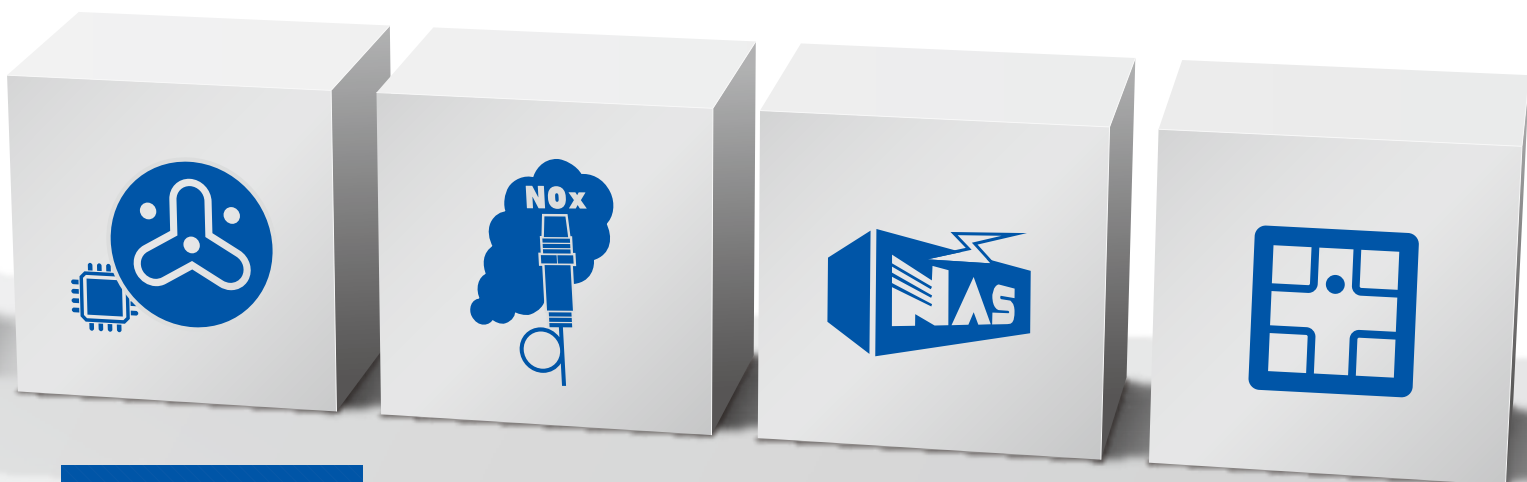
Beryllium-copper alloys, which add the strength and durability of special steel to copper's characteristic heat and electrical conductivity, are used in mobile phones, automobiles, industrial machinery, and a host of other things in order to make a major contribution to improving reliability while reducing product size and weight.

Ceramic substrates for automotive catalytic converters

Ceramic catalyst carriers neutralize the harmful substances in automotive exhaust. Their honeycomb design results in a large surface area—the area that comes in contact with the exhaust—and a very compact installation.

Visit our website to see our main products. <https://www.ngk-insulators.com/en/product/index.html>





Ceramics for semiconductor manufacturing equipment

By leveraging the features of ceramics, NGK is able to make a range of ceramic products for semiconductor manufacturing processes that are exposed to high-temperature corrosive gases and plasma.

NOx sensors

NGK has developed the world's first vehicle-mounted sensor capable of measuring the concentration of NOx (nitrogen oxide) contained in automotive exhaust at the ppm (parts per million) level.

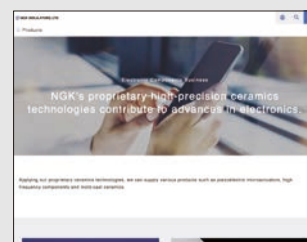
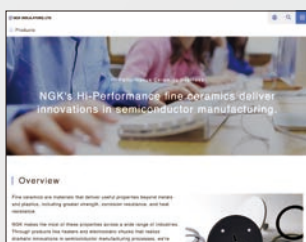
NAS[®] battery systems

NGK manufactures megawatt-level electric power storage systems with superior features including large capacity, high energy density, and long service life. They are utilized in stabilizing output from wind and solar power generators while proving useful to the spread of renewable energies and the establishment of smart grids.

Ceramics for electric and electronic machinery

NGK contributes to the advancement of electronics through products such as composite wafers that enable higher quality and higher speeds in communication, and piezoelectric micro-actuators that enable hard disk drives with higher capacity and greater reliability.

Visit our website to see our main products. <https://www.ngk-insulators.com/en/product/index.html>



History of the NGK Group

Using Unique Technological Strengths Cultivated in Insulator Manufacturing to Build a Diverse Portfolio of Industries

NGK was founded in 1919 as a manufacturer of porcelain insulators, a key component in the modernization of Japan. Now, 99 years later, our insulators are helping support the electrical power infrastructure of the entire world. Not only that, we have capitalized on—and continue to capitalize on—the ceramics technology, which we cultivated over many years of insulator manufacturing, adapting it to the production of a vast array of products that have made NGK a prominent contributor in a diverse range of industries.

1919 High-voltage insulators

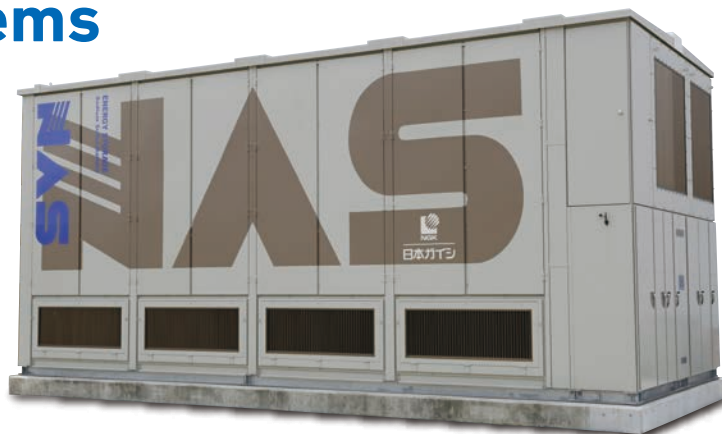
Electrification gradually began to gain traction at the end of the 19th century. At the time, Japan relied on imports for high-voltage insulators. “To make a contribution to the country, and not merely for our own profit, we must provide Japan with its own, domestically manufactured insulators.” (Kazuchika Okura, founding president of NGK) With this sense of mission, NGK managed to get hold of a piece of an American-made insulator, which it began studying in order to develop its own high-voltage insulators. The desire to contribute to people’s lives and the development of industry was integral to our founding and continues to be the cornerstone of our corporate philosophy.



Electric energy storage system

NAS[®] battery systems

A product of NGK's proprietary advanced ceramic technologies, the NAS battery was the world's first commercialized battery system capable of megawatt-level electric power storage. It is increasingly being utilized in stabilizing output from wind and solar power generators while proving useful to the spread of renewable energies and the establishment of smart grids.



2018



Ceramic substrates for automotive catalytic converters

HONEYCERAM[®]

Ceramic catalyst carriers neutralize the harmful substances in automotive exhaust. For maximum exhaust cleaning efficiency, HONEYCERAM was designed with minimum weight and wall thickness: the 0.05 mm walls minimize loss of engine power.

World's first vehicle-mounted

NOx sensors

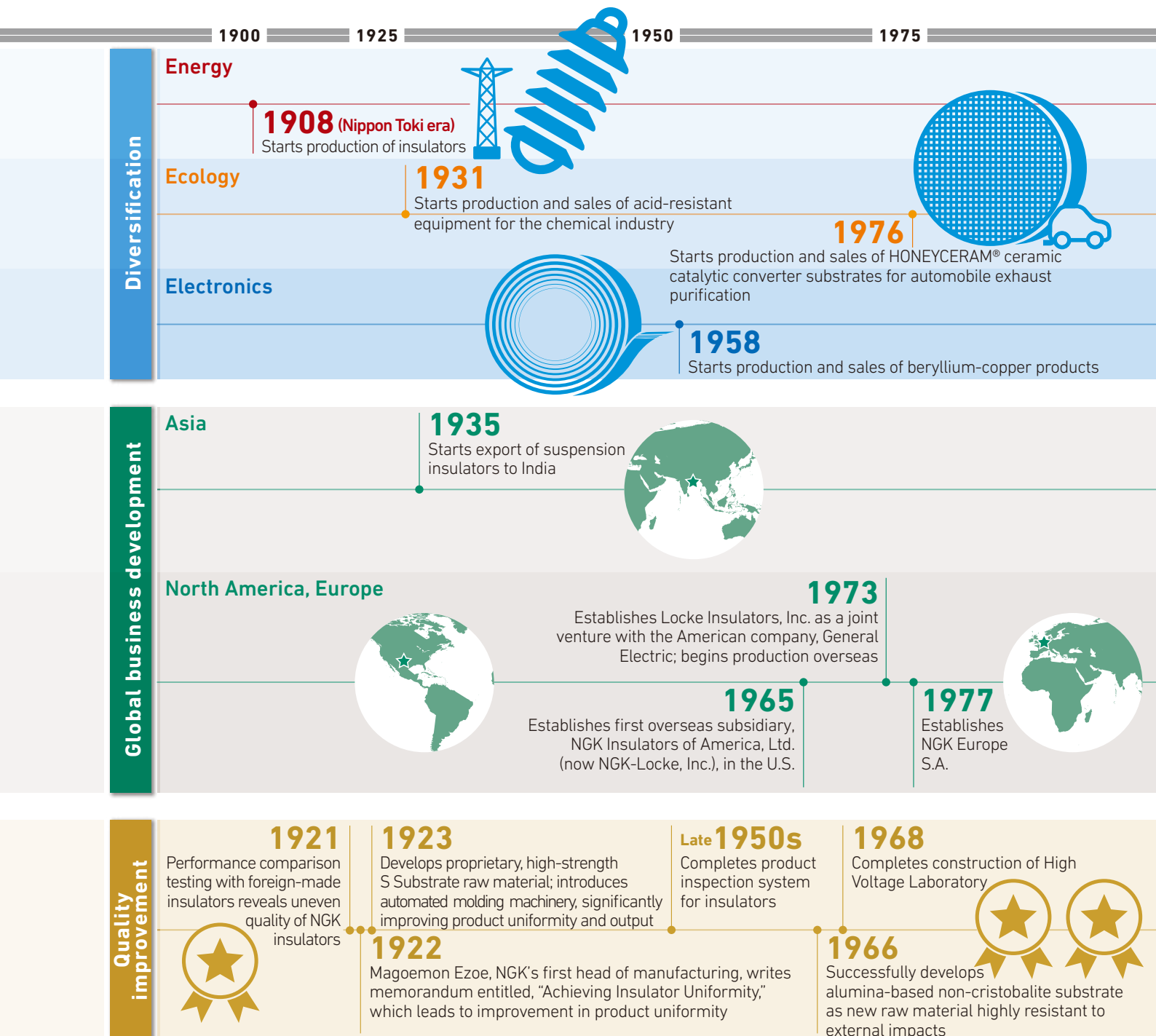
This sensor is able to measure the concentration of NOx (nitrogen oxide) contained in automotive exhaust at the ppm (parts per million) level. Measuring real-time NOx concentrations and feeding back that information to the engine controls enables precise control of the exhaust purification system to reduce NOx emissions.



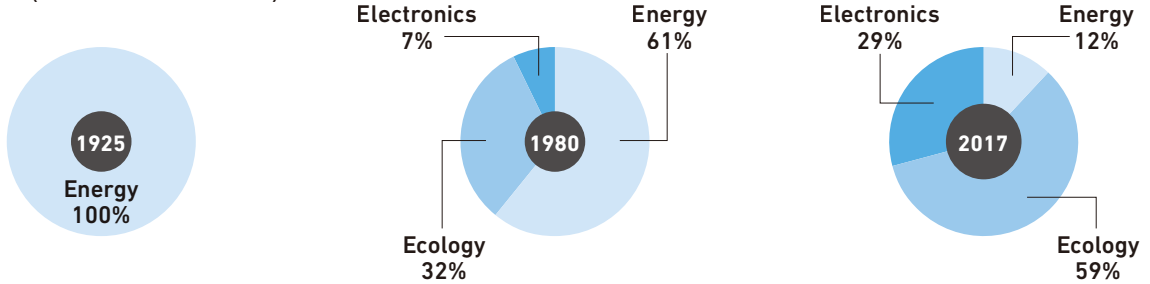
History of the NGK Group

Preserving the Founding Principles of NGK Business Diversification, Global Business Development, Quality Improvement

Since its founding, NGK has offered products boasting the highest quality and reliability thanks to the incorporation of exceptionally refined ceramics technology. At the same time, NGK has actively sought opportunities for business diversification and global development. This tradition of exploring new fields and seeking new challenges remains alive and well at NGK as we continue to pursue sustainable business growth.



Expansion into Diverse Business Sectors (in terms of sales amount)



1985

2000

2010

2015

2003

Starts mass production of NAS[®] batteries

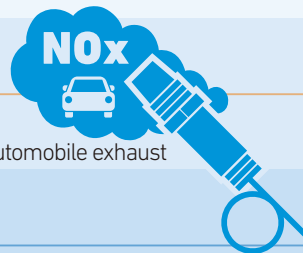


1989

Starts production of diesel particulate filters (DPFs)

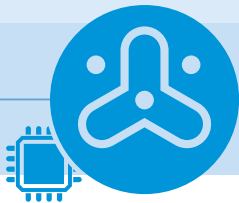
1996

Starts production of NOx sensors for automobile exhaust



1996

Starts mass production of ceramics for semiconductor manufacturing equipment



1996

Establishes NGK Insulators Tangshan Co., Ltd. for insulator production in China



2015

Establishes NGK Ceramics (Thailand) Co., Ltd. for HONEYCERAM and DPF production in Thailand



1996

Establishes P.T. NGK Ceramics Indonesia for HONEYCERAM production in Indonesia



1985

Establishes NGK Ceramics Europe S.A. in Belgium; begins local production of HONEYCERAM



1988

Establishes NGK Ceramics USA, Inc. in the U.S.; begins local production of HONEYCERAM



2003

Establishes NGK Ceramics Polska Sp. z o.o. for DPF production in Poland

1982

NGK's AC Plant becomes first Japanese manufacturer to receive Ford Motor Company's QI Award

1999

High Voltage Laboratory becomes first internationally accredited high-voltage testing laboratory in Japan

2009

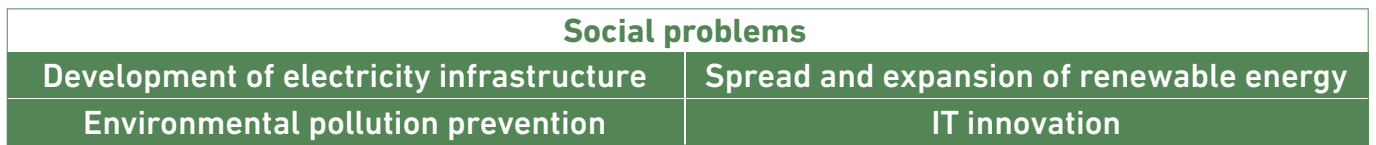
Implements Reformed Manufacturing Structures; production systems, design, manufacturing equipment, etc., are revised from square one



Value Creation by the NGK Group

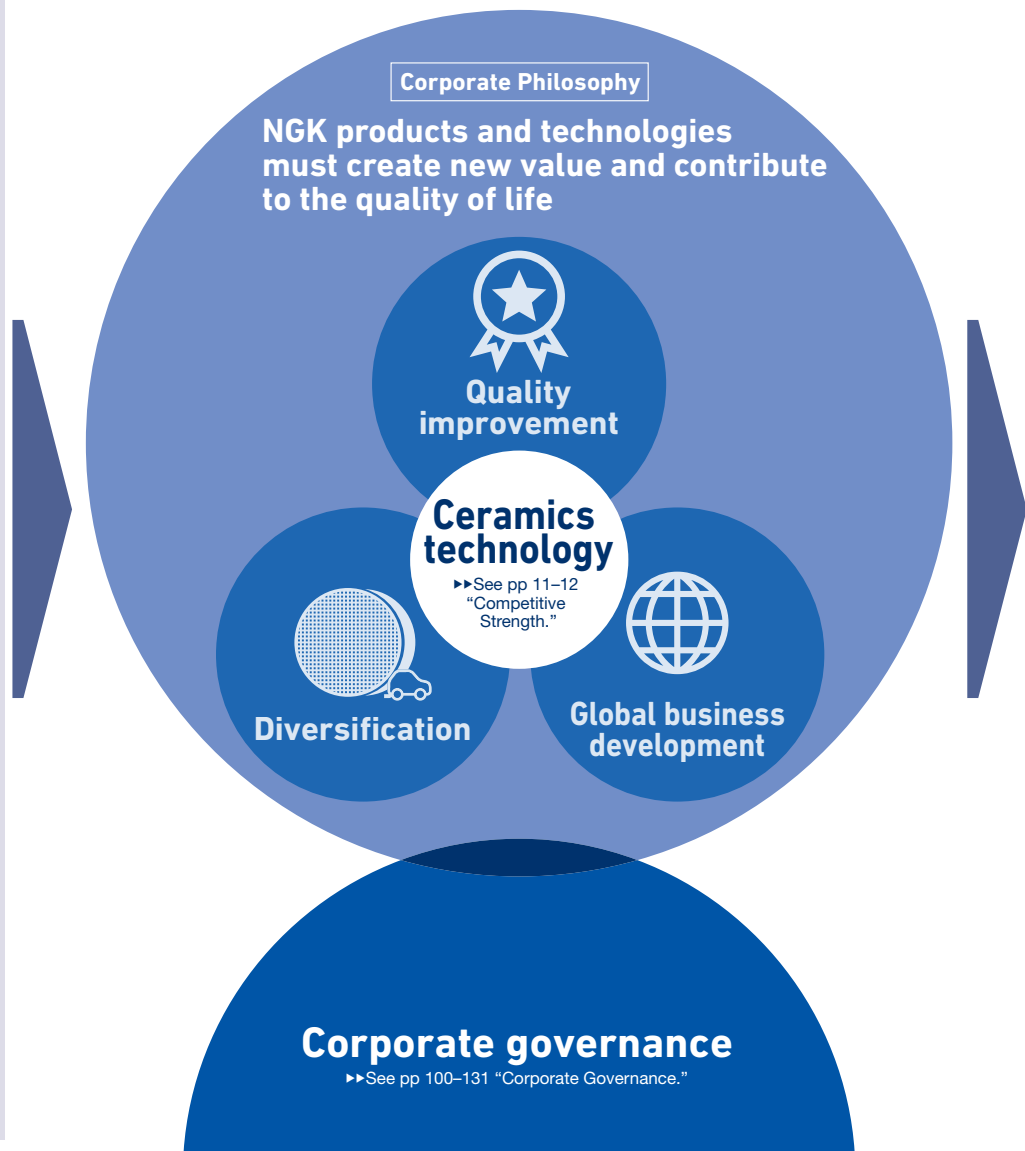
Using Advanced Technology to Power a Unique “Value Creation Engine”

Thanks to the unique ceramics technology it has cultivated over many years, the NGK Group is able to develop a wide variety of high-quality products that it seeks to offer in a growing range of overseas markets. As a result, the NGK Group creates diverse value, which helps to address social problems.



Input (fiscal 2017)	
Financial capital	
• Total assets	836.3 billion yen
• Cash and cash equivalents	169.9 billion yen
Manufactured capital	
• Capital investment	71.7 billion yen
• Fixed assets	363.9 billion yen
Intellectual capital	
• Investment in R&D	21.1 billion yen
• Number of patents held	4,186
Human capital	
• Employees	19,000 people
Social and relationship capital	
• Consolidated subsidiaries	Domestic 21 companies Overseas 37 companies
Natural capital	
• Electricity	880,000 MWh
• Gas	142 million Nm ³
• Oil	2.25 million liters
• Raw materials	192,000 metric tons
• PRTR-listed substances	707 metric tons
• Water	4.32 million m ³

Value creation engine of the NGK Group



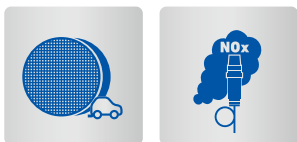
Output

Power business



Insulators NAS[®] batteries

Ceramic products business



Ceramics for purifying automobile exhaust NOx sensors

Electronics business



Ceramics for electronic and electrical devices Beryllium-copper products

Process technology business



Ceramics for semiconductor manufacturing equipment Industrial machinery and devices

Results (fiscal 2017)

Consolidated net sales

451.1 billion yen

Profit attributable to owners of parent

45.8 billion yen

ROE

10.4%

Total sales of products contributing to environmental protection

245.6 billion yen

Social contribution spending

0.3 billion yen

Avoided NOx emissions

4 million metric tons per year

Note: Assumes exhaust systems are equipped on new automobiles that do not have equivalent systems.

Values provided by the NGK Group

Ensure access to affordable, reliable, sustainable, and modern energy for all



- Insulators are indispensable to stable power supply
- NAS batteries allow stable supply of renewable energy
- Ceramics for purifying automobile exhaust make exhaust gas clean, thus enabling clean usage of fossil fuels

Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation



- Ceramics used in electronics make ICT cheap and ubiquitous
- Ceramics used in semiconductor manufacturing equipment let the semiconductor industry be the foundation for modern daily life
- Metal products are widely used in mobile phones, automobiles, industrial equipment, and other devices that undergird modern life

Take urgent action to combat climate change and its impacts



- NAS batteries aid in the fight against climate change by allowing stable supply of renewable energy

Make cities and human settlements inclusive, safe, resilient, and sustainable



- NAS batteries enable innovation in urban energy management for the creation of sustainable cities

Ensure healthy lives and promote well-being for all at all ages



- Ceramics for purifying automobile exhaust make exhaust gas clean

Conserve and sustainably use the oceans, seas, and marine resources for sustainable development



- Ceramic membrane filters purify wastewater to prevent marine pollution

Ensure availability and sustainable management of water and sanitation for all



- Ceramic membrane filters provide highly safe water
- Ceramic membrane filters purify wastewater

Competitive Strength

Competitive Strength Built on the Relentless Pursuit of Ceramics Manufacturing Optimization

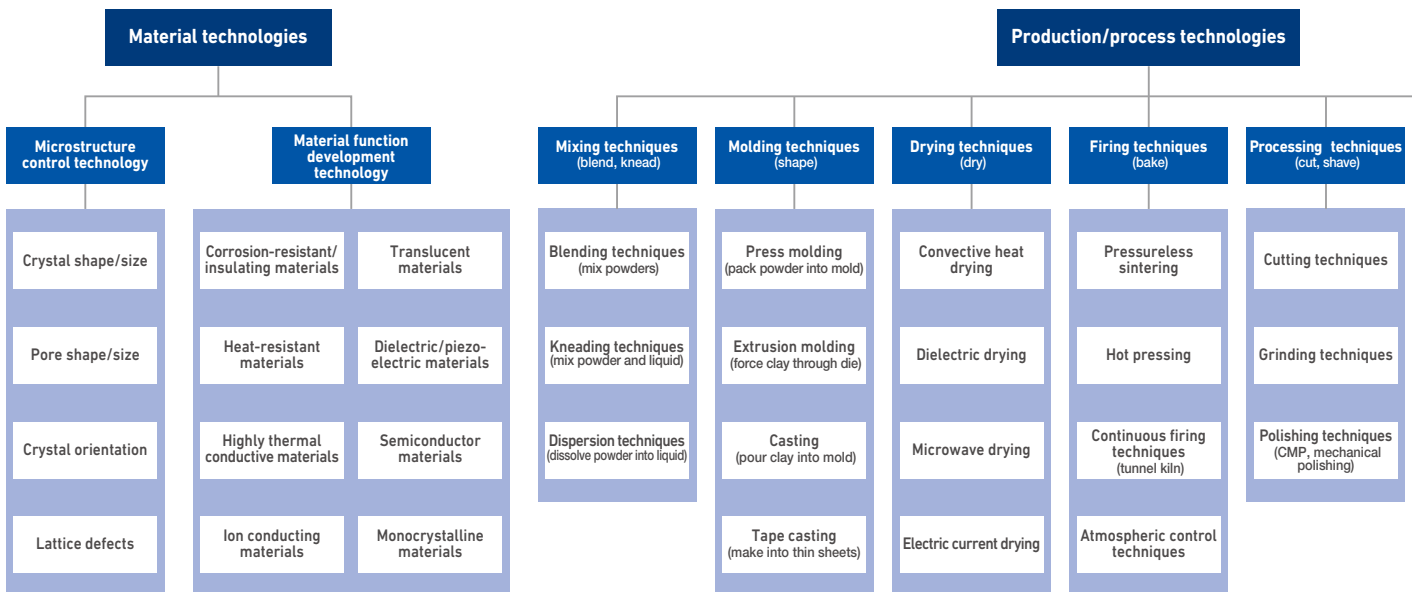
From its very beginning, the NGK Group has sought to reexamine conventional ceramics manufacturing practices in light of the latest science and technology in order to help it identify the optimal combination of process conditions for each of its products. And after nearly 100 years, this pursuit of optimization has accrued a wealth of technology and expertise from which the NGK Group draws its competitive strength.

Mixing, molding, and firing. A puzzle with endless combinations.

Ceramics manufacturing is patient, methodical work, which requires you to blow life into inanimate material that is hard and brittle. You start by choosing from among tens of thousands of raw ingredients that will provide the best combination suited to your needs, and then you mix them. After you have calculated what shape your product needs to have after firing, you mold it. Finally, you perform firing to achieve the optimal microstructure and component structure in your product.

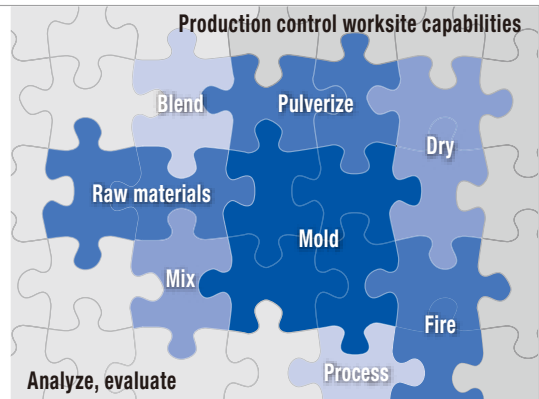
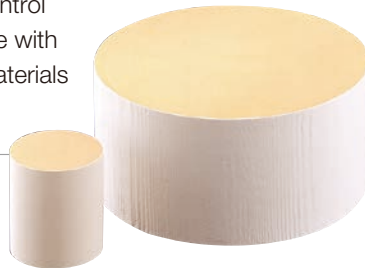
This interconnected series of processes involves an almost unlimited number of parameter combinations. Each product is like its own, complex jigsaw puzzle, and every piece is essential.

■ NGK Core Technologies



Key technology in the manufacture of the HONEYCERAM® ceramic catalytic converter substrate for automobile exhaust purification

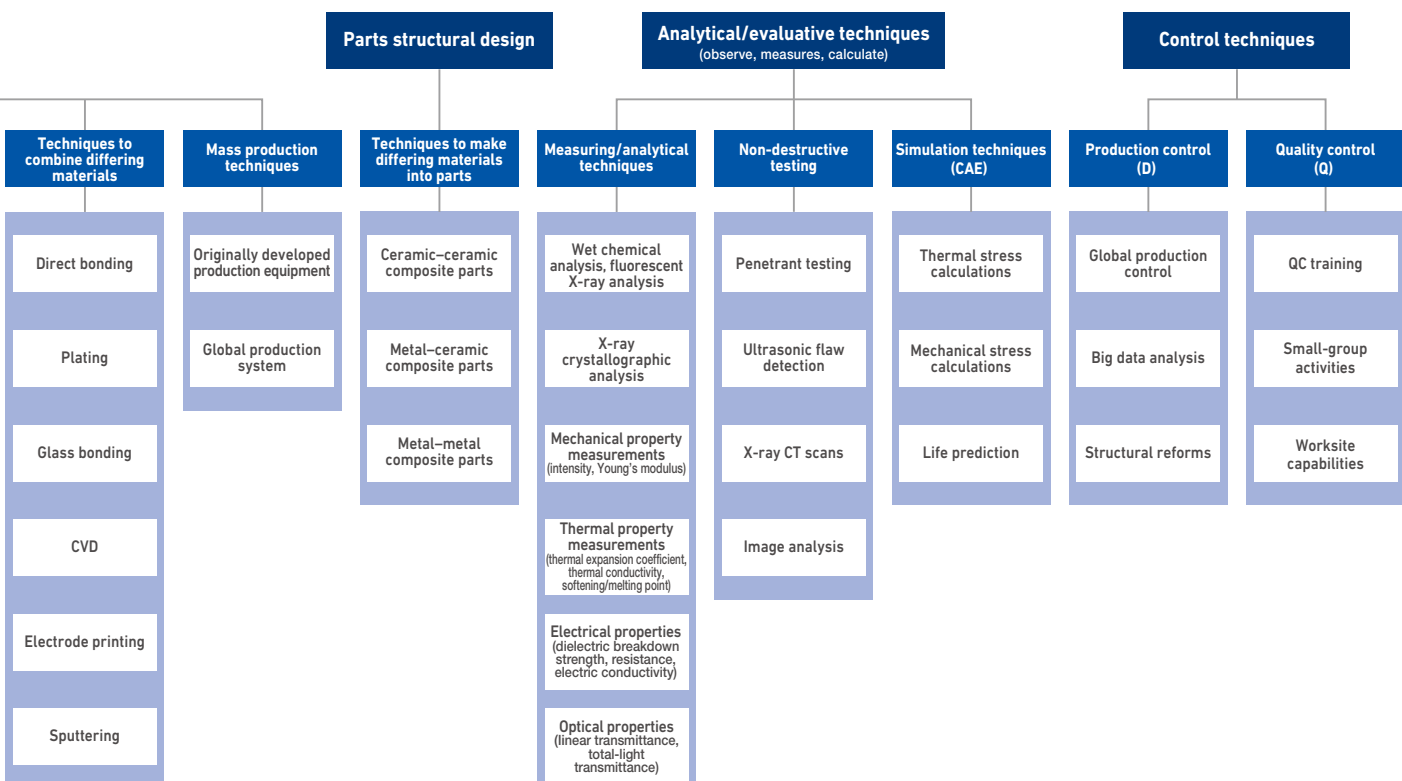
In order to ensure product uniformity, it is essential that we perform on-site analysis, evaluation, production control, and other measures that allow us to control the production process in line with the slight variations in raw materials characteristics of each lot.



Achieving uniformity in mass production can take 10 years or more

Uniformity, i.e., little to no variation, is essential for industrial products. This is particularly true for insulators, which the NGK Group has been manufacturing since its founding. A single broken insulator will knock out the entire power transmission line; thus, strict quality control has always been necessary. As a result, the pursuit of uniformity has become embedded in the very corporate DNA of the NGK Group.

We methodically search for the optimal and most cost-efficient combination of parameters to use in the mixing, molding, firing, and other processes, and then we steadily work to improve these to achieve uniformity in mass production. Finalizing each process takes a great deal of time; with difficult products it can take 10 years or more. At NGK, our starting point is, and has always been, an uncompromising management policy combined with methodical diligence on the job. This is the reason why NGK products—from insulators to HONEYCERAM, NOx sensors, NAS® batteries, and semiconductor manufacturing equipment products—are so far beyond anything our competitors have to offer.






Message from the President

Approaching the 100th Anniversary of NGK's Founding Unique and Unrivaled Ceramics Technology—Our Wellspring of Growth

May 2019 will mark the 100th anniversary of NGK's founding. Beginning with insulator manufacturing, we have steadily expanded our specialist fields to include automotive components, electronics, semiconductor manufacturing equipment, and others. All the while, we have maintained a single-minded commitment to continually develop and perfect diverse ceramics technologies. Thus, the history of NGK is also a history of technology.

To meet growing needs and to cultivate new business opportunities, we are undertaking the largest investments made since NGK was founded. For fiscal 2018—our 99th year as a company—the shared goal of everyone in NGK is to do what we must do to deliver an expanded range of products that take advantage of our unique technologies to even more people and to achieve even greater growth.



NGK Insulators, Ltd.
President

Takuo Oshima

Cultivating legacy of material and production technologies that sets us apart

Since its founding, NGK has consistently focused on cultivating ceramics technology—particularly, material technology. As our most important strength, material technology involves the precise control of crystal sizes, shapes, and other characteristics. The growth of our company has always been driven by the immense legacy of technological knowledge and expertise that we have accumulated over our many years of operation.

In addition, we need to develop our unique production technologies to make full use of these technologies. It is by using these technologies together hand in glove that we have produced all of current NGK's core products. What sets NGK apart is our capacity to come up with products made by hand, develop optimized techniques for commercially mass-producing them, and then refine these to a point beyond the ability of other companies to imitate. This is the strength that we have been cultivating and that has become our wellspring of growth.

We are also known for our tenacity and perseverance when it comes to technological development. The demand for NOx sensors first took off in 2010, when new U.S. regulations came into full effect. However, by that point, NGK had already been at work for more than 15 years developing these sensors. We also spent over 10 years developing our gallium nitride wafers, which are used to produce laser light and which are installed in projectors and other equipment.

Just because we create a technology doesn't mean there's an immediate demand for it. And, we, as a company, need to make a profit. It is difficult to manage, but NGK has a mission to devote time and patient effort to cultivating technologies that society will truly need at some point in the future.

We use new technology to grow our profits, which we then invest in the development of new products. We used our profits from insulators to develop automotive-related products. Now, our automotive-related profits have become a foundation for growing our semiconductor-related products. Maintaining this cycle is absolutely crucial to keeping the company on a growth track.

Thus, we created the company-wide "2017 Challenge 30" initiative, which sets a five-year goal of increasing the share of new products to 30% of total sales by fiscal 2017. We achieved our target percentage in fiscal 2017 and are now working to maintain it with the "Keep up 30" initiative. As sales revenues grow, it becomes harder to maintain this percentage. There may be some products the market will not be receptive to; nevertheless, our commitment to new product development remains undaunted.

An investment of over 300 billion yen Undertaking large-scale capital investment in seven sites globally to expand automotive and semiconductor manufacturing equipment-related production

NGK is currently undertaking a three-year, over-300-billion-yen investment plan, which began in the previous fiscal year to connect the company's technological strengths with growth.

Nearly half of this investment is for automotive-related products, and we build new plants in Japan and overseas, and extend facilities at existing ones. Approximately 50 billion yen is for semiconductor manufacturing equipment-related products. The remainder is being invested in the development of new products, such as ceramic batteries, and the expansion of existing production lines for new products.

In Europe, NGK Ceramics Polska has begun expanding its production facilities and equipment, and is already boosting its production capacity, while NGK Ceramics Suzhou in China is scheduled to bring its No. 2 Plant on line in December 2019. In Thailand, NGK Ceramics (Thailand) began operations at its new plant this spring. This automotive-related plant produces, among other products, ceramics for purifying automobile exhaust. In Japan, we are investing in NOx sensor production at the NGK Ceramic Device Ishikawa Plant in Nomi, Ishikawa Prefecture with the aim of starting expanded production in January 2019.

Message from the President

Major Capital Investments in Fiscal 2017

NGK Ceramics Polska

Products:
NOx sensors (assembly), diesel particulate filters



NGK Ceramics Suzhou

Products:
Diesel particulate filters



Komaki Site, NGK Insulators

Products:
Ceramics for semiconductor manufacturing equipment



Chita Site, NGK Insulators

Products:
Ceramics for semiconductor manufacturing equipment



NGK Ceramics (Thailand)

Products:
Honeyceram



Ishikawa Plant, NGK Ceramic Device

Products: NOx sensor components

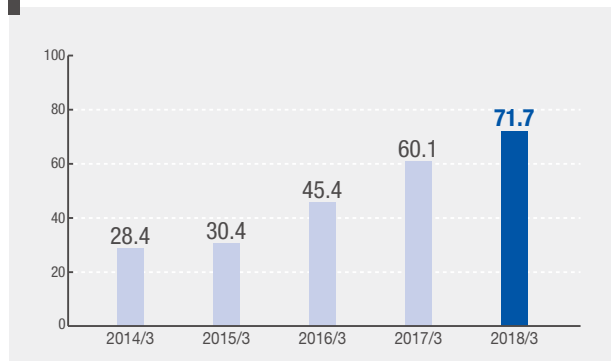


Tajimi Plant, NGK Ceramic Device

Products: Ceramics for semiconductor manufacturing equipment

Additionally, as we are currently under-supply capability to respond to rapidly growing demands for semiconductor manufacturing equipment-related products, we are working to increase our production capacity by accelerating construction of a new production site in Tajimi, Gifu Prefecture as well as undertaking capital investment in our existing Komaki and Chita sites.

Capital investment for the past 5 years (Billion yen)



New product development

Commercialization of three types of ceramic batteries and two optical components

In the area of new product development, NGK is creating product applications to commercialize three types of ceramic batteries. One is a chip-type ceramic secondary battery. It is as small as a postage stamp and has an ultra-thin, 0.4 mm body, while the incorporation of our unique crystalline orientation technology achieves high energy density. Anticipated applications for this battery include ultra-compact wireless IoT modules equipped with sensors, and next-generation credit cards with highly secure fingerprint authentication.

We are also developing a zinc secondary battery. Although zinc itself is widely used for the electrodes in primary batteries, its propensity to cause short-circuiting when repeatedly charged has prevented it from being used in (rechargeable) secondary batteries. At NGK, we have successfully realized a zinc secondary battery through the development of our proprietary hydroxide ion-conducting ceramics. Besides offering a large capacity, this battery, uses an aqueous electrolyte unlike lithium-ion types of batteries, and thus offers a high level of safety, which makes it suitable for indoor applications.

Third one is a solid oxide fuel cell (SOFC) module, which uses hydrogen from city gas to generate power. Our unique, all-ceramic design makes the battery durable while still allowing for high generating efficiency.

Additionally, the development planning we have undertaken as part of our Optical Component Project has resulted in two new products that we released in fiscal 2017.

One is a gallium nitride wafer, which can replace conventional mercury lamps in the design of base substrates to make projector light sources with an unprecedented, ultra-high brightness. The other is a micro-lens for UV LED lights, which can be used to improve the sterilization efficiency of UV LED lights by narrowing their irradiation area.

Business outlook

Satisfying market demand in an unprecedented growth period while developing new products and technologies

Now that the demand for automotive-related products and semiconductor manufacturing equipment-related products is exploding, NGK is undertaking the largest level of capital investments in its history. On top of this, technology developments such as AI and autonomous vehicles continue to create entirely new areas of business. NGK is in an unprecedented period of growth, and therefore we need to be improving productivity and expanding production in our existing businesses to generate solid profits that can then be applied to new product development.

We need to remain alert and attentive to growing trends and the emerging needs of changing times for sowing seeds for business. In the case of new business areas, as mentioned earlier, one area we are focusing on is base substrates for control circuit formation in IT. Our research and development in this area is quite active, and we are also evaluating a variety of ideas related to ceramics.

Message from the President



Ishikawa Plant, NGK Ceramic Device

In 2017, the EU and China announced a policy change aimed at promoting the widespread adoption of electric vehicles (EV), but at NGK we are anticipating that the demand for gasoline and diesel-powered vehicles will be still increasing up through the mid-2020s, creating a bigger demand, which our supply capacity will need to expand in order to meet.

Even if you just look into battery issues, it is figured out that EVs have a number of hurdles to overcome before widespread adoption can be achieved. The lithium-ion secondary batteries currently used for EVs are not sufficiently durable and have issues in raw material procurement. Also, although a number of companies are trying to develop an all-solid-state battery, which would be superior in terms of safety and performance, there would still be a variety of challenges left, such as improving thermal durability. Because it takes time to go from the development phase to the evaluation phase, even if the all-solid state type of battery is developed by 2020, achieving practical application would take until at least the mid-2020s. This is why we believe that the demand for gasoline and diesel vehicles will continue to grow up through the mid-2020s.

In fact, because of this likely continued growth in demand, it makes research into cleaner exhaust technologies all that much more essential. Towards this end, we are currently working on improving vehicle cold starts, which involves a large amount of exhaust material being expelled when the engine is turned on. If the catalyst in the vehicle is preheated electrically before the engine starts, this will reduce the amount of exhaust material expelled during a cold start. This is the sort of area into which we can expand our business and find a good deal of room for growth.

Foundation for value creation

Encouraging employee spontaneity through systemic reform

For the NGK Group, having a system in place for developing our human resources is essential to our future corporate growth as well. That is why, in April 2017, we undertook the first reform of our personnel system in 25 years. Major aspects of this reform included incorporating a system for more rapid promotion of younger employees to positions of responsibility, expanding female representation in more job categories, shifting the salary scale for younger employees, and raising the mandatory retirement age to 65. Our goal is to create an environment which motivates and challenges employees.

Towards that end, it is important not only to put various systems in place but also to foster greater initiative-taking among employees. We want to be able to give employees an area to focus on and then leave it up to them to independently and proactively pursue the important challenges that arise from it.

I always tell employees that safety, the environment, quality, and CSR are all fundamental parts of their job that need to be addressed. Both in Japan and overseas, safety has been an extremely important focus for NGK. We are also steadily addressing environmental preservation-related issues, such as CO₂ reduction. Our policy moving forward includes expanding a lineup of environmentally friendly products.

With regard to corporate governance, in 2015, we established committees such as the Nomination and Compensation Advisory Committee and Business Ethics Committee. In June 2017, we appointed a female outside director. Furthermore, we conducted a survey regarding the effectiveness of our Board of Directors, and the issues identified from this have led to active and vital discussion by the Board.

Unfortunately, however, it has come to light that in January 2018 a shipment of our insulators and other products from the Power Business Group did not undergo delivery tests as per the agreement with customers. Although these products all passed pre-shipment tests performed as per in-house regulations, the delivery tests that were required to be conducted in accordance with agreement with customers were not carried out appropriately. I offer my deepest apologies to our customers and all other affected parties for the great inconvenience and concern which this caused.

We used the annual corporate reorganization carried out in April 2018 to perform a systemic review to ensure this sort of incident never happens again. In order to strengthen our quality management and quality compliance foundations, we are rolling out quality-focused activities for work quality as well as for product quality; we are building a quality compliance program led by top management and carrying out thorough audit; I myself provide direct guidance at a Quality Committee that heads quality-focused activities company-wide; and we are working to strengthen the quality assurance departments in our business divisions.

Furthermore, we are developing rules, strengthening management and encouraging management to demonstrate their commitment at every chance they get in order to establish a corporate climate which is uncompromising with regard to compliance.

Looking ahead to the next 100 years **What needs to be done is clear. The question is how we accomplish.**

We are in a period of rapid growth without precedent, and there are still so many factors and opportunities which the NGK Group can capitalize upon for even greater growth. We must not squander these opportunities; rather, our mastery of them will determine the course of NGK's next 100 years.

I tell everyone in NGK that the key word for this year is "completion." By that, I mean we must be thorough in completing our preparations this year for the coming centenary.

We will carry through capital investments. We will meet the needs of the market. Although it will be challenging, what needs to be done is clear. My hope is that this spirit of "completion" will drive us to tackle each of the challenges facing NGK and help us cultivate a foundation for sustainable growth that will take us through the next 100 years.



At a Glance

■ Global Production Bases

Consolidated net sales
451.1 billion yen
 (up 12.4% year-on-year)

America



● FM Industries

● NGK-Locke Polymer Insulators
 NGK Metals ● NGK Ceramics USA

● NGK Ceramics Mexico

Number of employees
18,783
 Note: Full-time regular employees. (up 7.2% year-on-year)



Net sales by region

Japan **123.8** billion yen
 (up 9.5% year-on-year)

North and Central America **109.3** billion yen
 (up 17.5% year-on-year)

Europe **95.7** billion yen
 (up 9.6% year-on-year)

Number of employees by region

Note: Full-time regular employees.

Japan **7,081**
 (up 4.4% year-on-year)

North and Central America **3,041**
 (up 4.9% year-on-year)

Europe **3,475**
 (up 31.2% year-on-year)

Tangible fixed assets by region

Japan **118.7** billion yen
 (up 13.4% year-on-year)

North and Central America **34.5** billion yen
 (down 10.8% year-on-year)

Europe **72.6** billion yen
 (up 36.0% year-on-year)

Europe



Asia



Africa



Oceania



- NGK Berylco UK
- NGK Ceramics Polska
- NGK Ceramics Europe
- NGK Berylco France



- NGK Insulators Tangshan
- NGK Ceramics Suzhou
- NGK Technocera Suzhou
- NGK Insulators

- Siam NGK Technocera
- NGK Ceramics (Thailand)



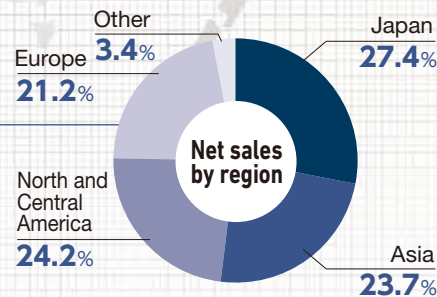
- NGK Ceramics Indonesia

- NGK Ceramics South Africa

- NGK Stanger

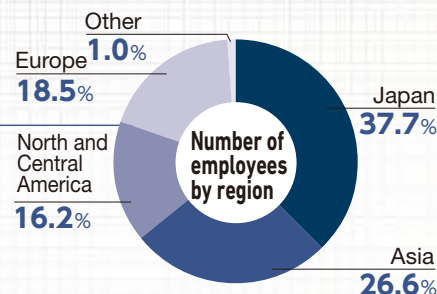
Asia **106.9 billion yen**
(up 11.0% year-on-year)

Other **15.4 billion yen**
(up 33.5% year-on-year)



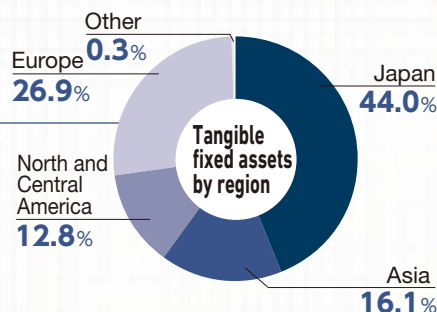
Asia **5,003**
(up 0.0% year-on-year)

Other **183**
(down 1.6% year-on-year)



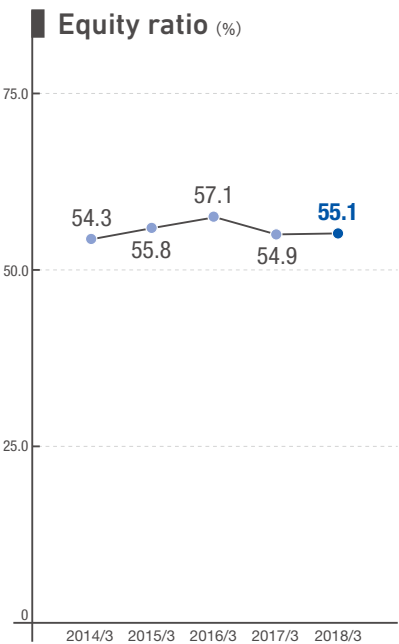
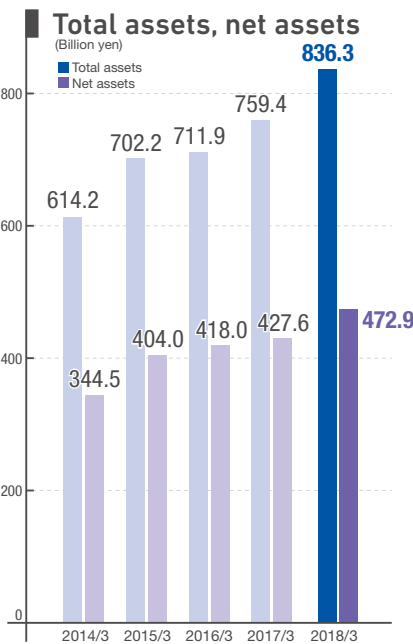
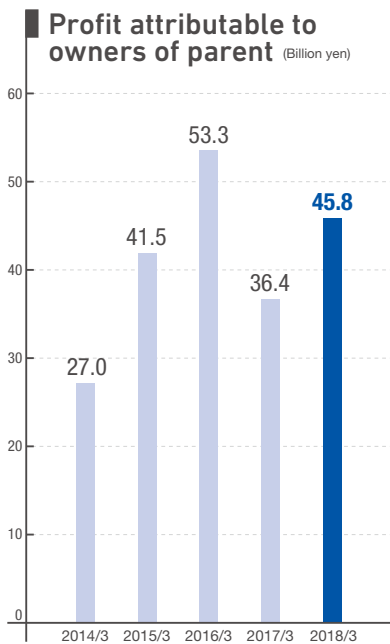
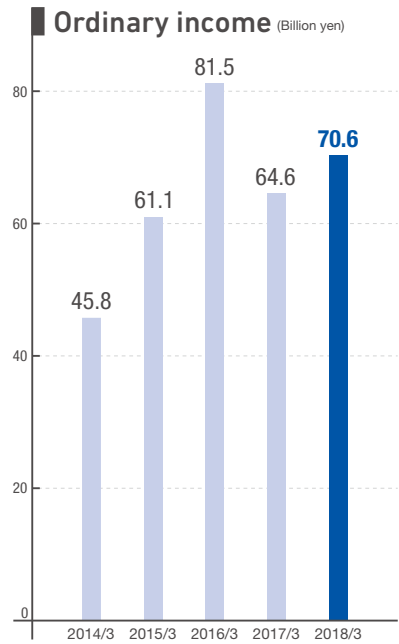
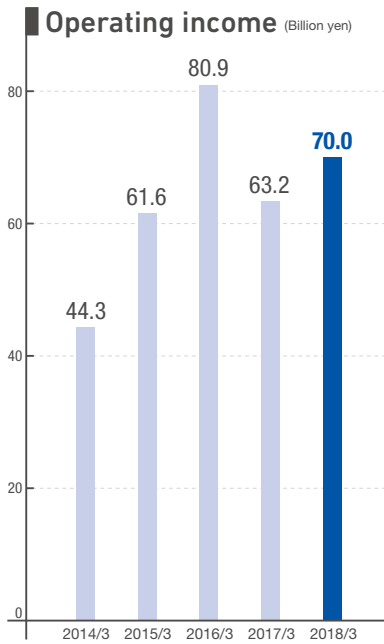
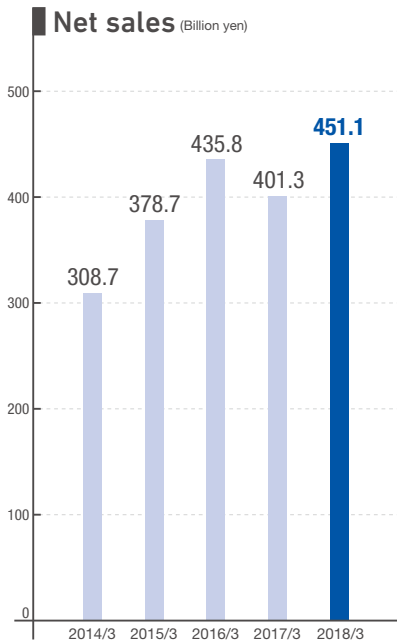
Asia **43.6 billion yen**
(up 37.1% year-on-year)

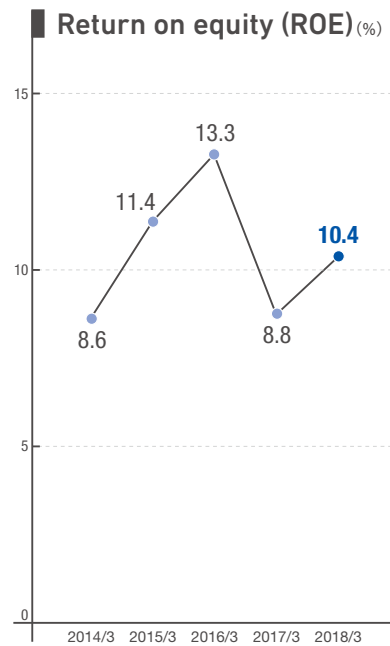
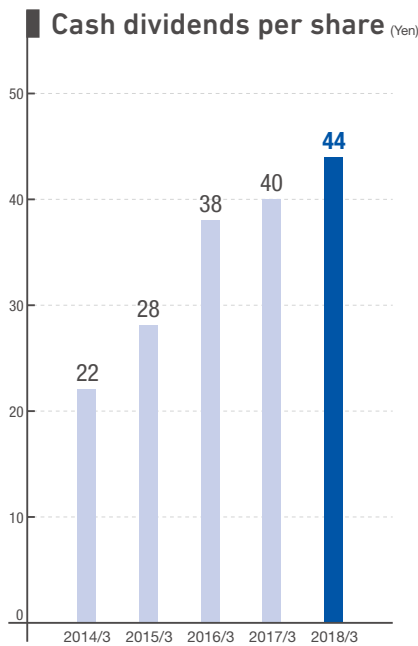
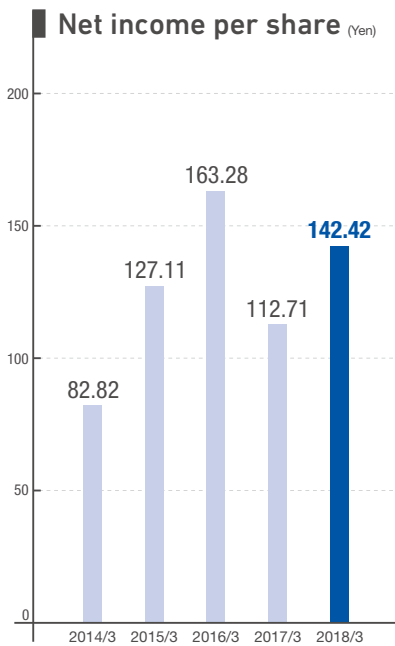
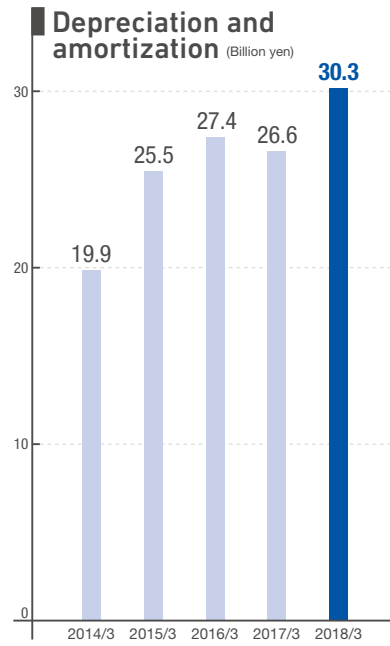
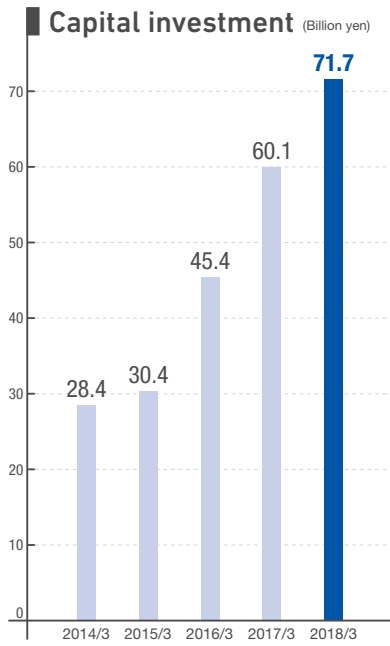
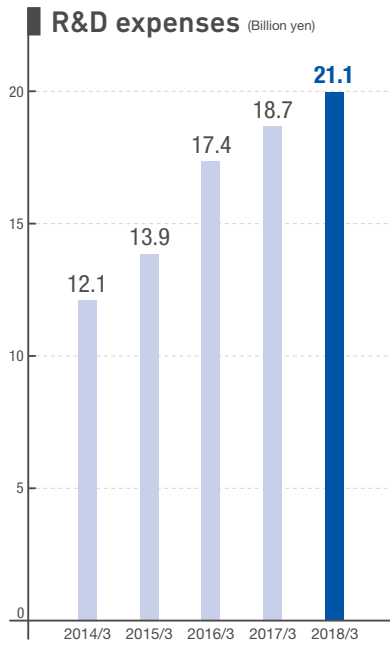
Other **0.8 billion yen**
(up 20.5% year-on-year)



Financial and Non-Financial Highlights

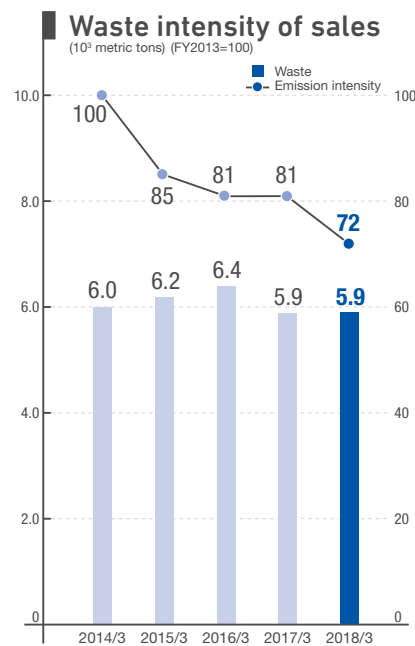
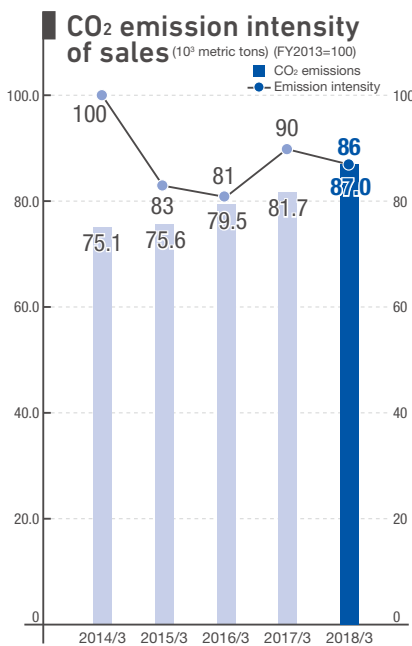
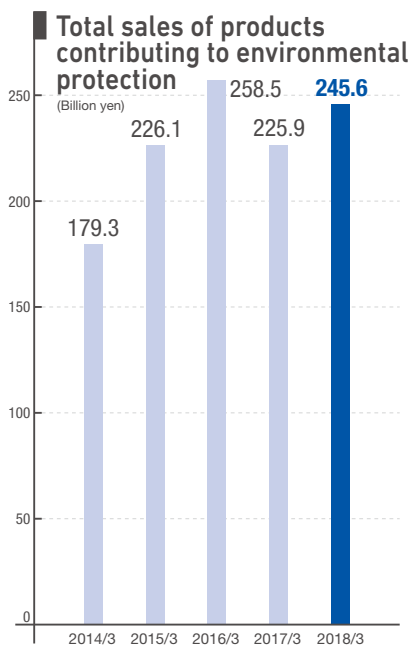
Financial indicators





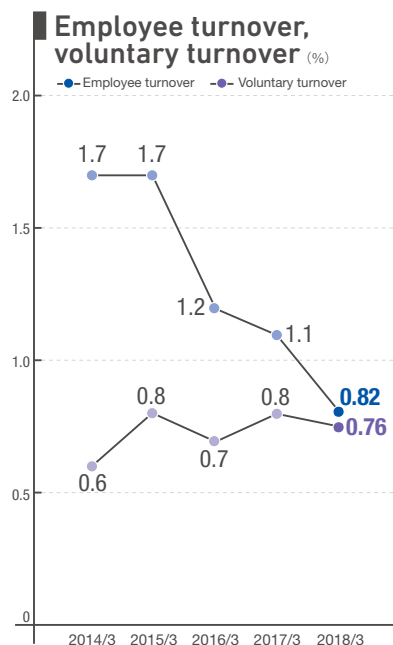
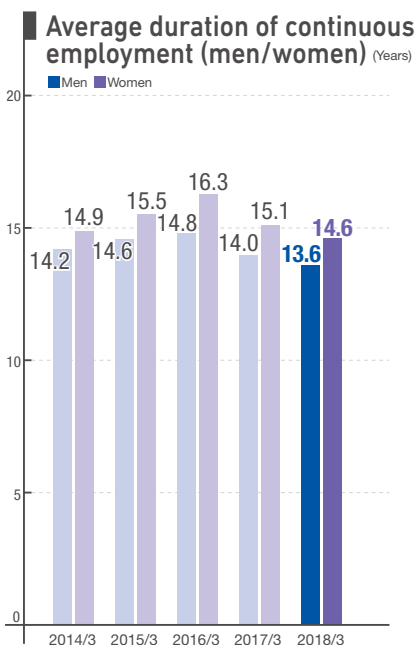
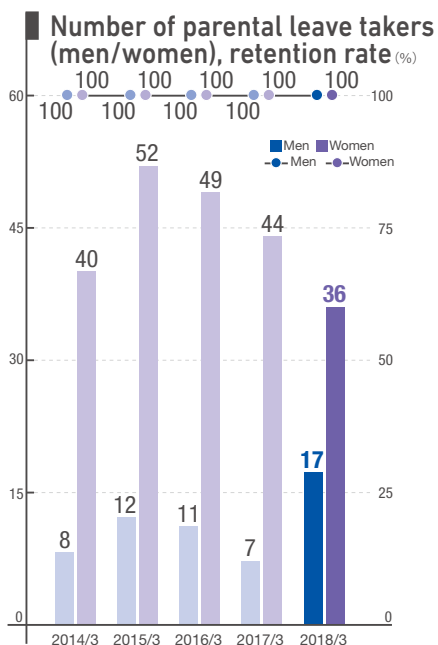
Financial and Non-Financial Highlights

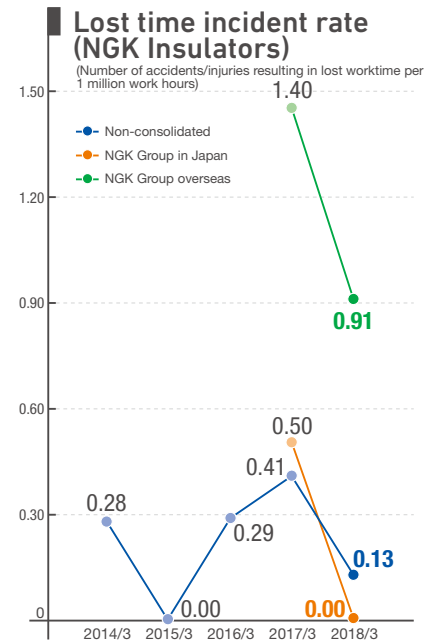
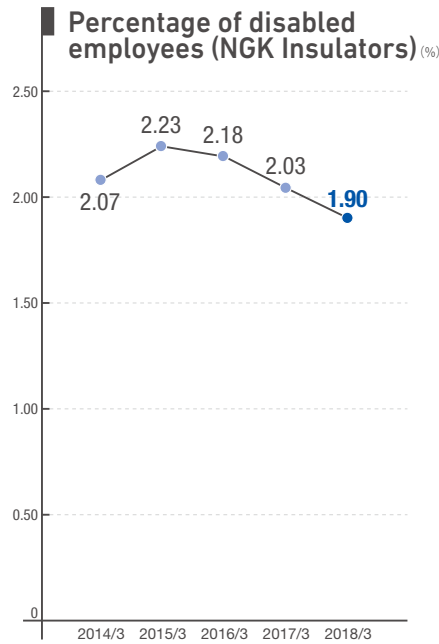
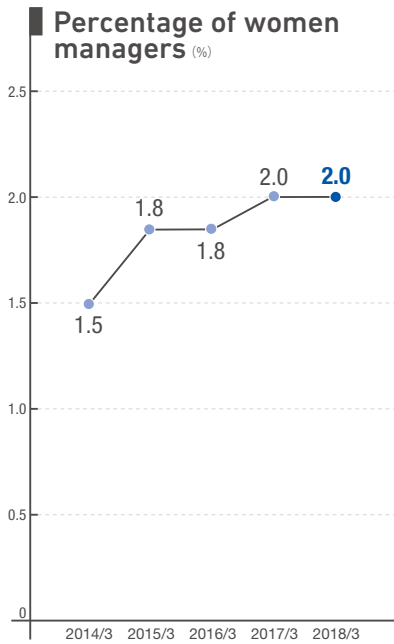
Environmental



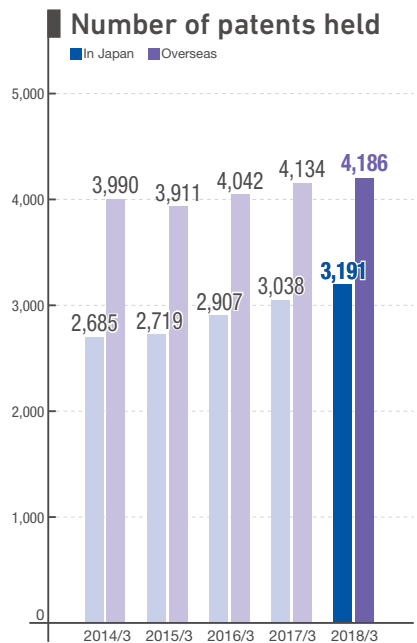
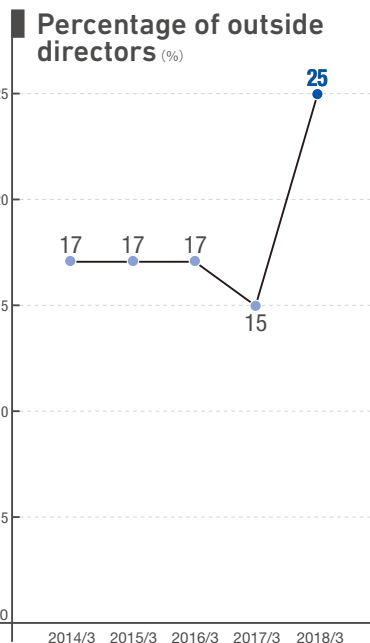
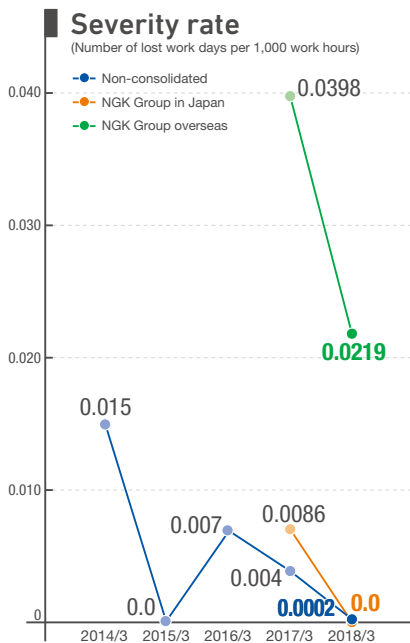
See p. 49 "Development and Distribution of Products Contributing to Environmental Protection."

Social





Governance



CSR Management

CSR Activities Concepts and Systems

Through its products and services, the NGK Group works to create new value that will improve the social environment and fulfill corporate social responsibilities while also earning the hope and trust of everyone in society. Towards this end, CSR promotion items are established according to the NGK Group Guidelines for Corporate Behavior, and, on top of this, each year CSR objectives are drawn up.

Corporate Philosophy

NGK products and technologies must create new value and contribute to the quality of life.

NGK Group Guidelines for Corporate Behavior	Action for Promoting CSR	CSR Objectives
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NGK products and technologies must create new value and contribute to the quality of life. Behavior guidelines for realizing our corporate philosophy Eight CSR actions established to match the eight actions in the Guidelines for Corporate Behavior

I. Realization of Corporate Philosophy Respond to the trust and expectations of society	Provision of products that contribute to a better social environment	<ul style="list-style-type: none"> ● Development and provision of products and services that help to preserve the natural environment ● Development and provision of products and services that embody safety and reliability ● Realization of higher-quality products and services
II. How to Engage in Business Activities Act with sincerity from a strong ethical stance	Disclosure of corporate information	<ul style="list-style-type: none"> ● Enhancement of corporate information disclosure ● Consistent improvement of internal controls relating to financial reporting
	Thorough enforcement of compliance, risk management	<ul style="list-style-type: none"> ● Thorough promulgation of the NGK Group Guidelines for Corporate Behavior through education ● Reinforcement of the risk management system ● Respect and protection of intellectual property rights ● Creation and consistent improvement of a framework for information security ● Strict adherence to the Anti-Monopoly Act, Subcontract Act, and other laws and regulations pertaining to business transactions ● Strict adherence to laws and regulations relating to export control
	Respect for humanity and ensuring comfortable working environments	<ul style="list-style-type: none"> ● Maintenance and consistent improvement of safe and comfortable working environments ● Development of human capital and recruiting of human resources across the Group ● Utilization of diverse human resources ● Support for better balance between work and home life/childrearing
	Implementation of fair, free, and transparent transactions	<ul style="list-style-type: none"> ● Fair and honest evaluation of procurement partners, and extensive resource diversification ● Promotion of CSR procurement
III. As a Member of Society Sustainably develop in partnership with society	Preservation of the global environment	<ul style="list-style-type: none"> ● Prevention of global warming ● Adoption of environmentally friendly production processes ● Promotion of resource recycling ● Strengthening of global environmental management
	Cooperation with local communities and promotion of contributions to society	<ul style="list-style-type: none"> ● Provision of scholarships and support for foreign students ● Cooperation with local communities, labor unions, and NPOs in social contribution activities ● Support for volunteer activities by employees
	Communication with stakeholders	<ul style="list-style-type: none"> ● Communication with customers and procurement partners ● Interaction with local communities via plant tours and open house events ● CSR Talk Live (discussions on implementing CSR with every employee class)

Behavioral Guidelines
 Guidelines indicating how to conduct oneself in daily work activities based on the Guidelines for Corporate Behavior

Review activities according to plans each year

Establishing CSR Promotion Items (Materiality)

Aiming to develop a sustainable society and in consideration of a variety of stakeholder demands, the NGK Group established eight items from the NGK Group Guidelines for Corporate Behavior as CSR promotion items determining the specific objectives and achievements for each item. Each year, we verify the achievement status of each objective in an attempt to continuously improve these efforts.

Process for Identifying Materiality

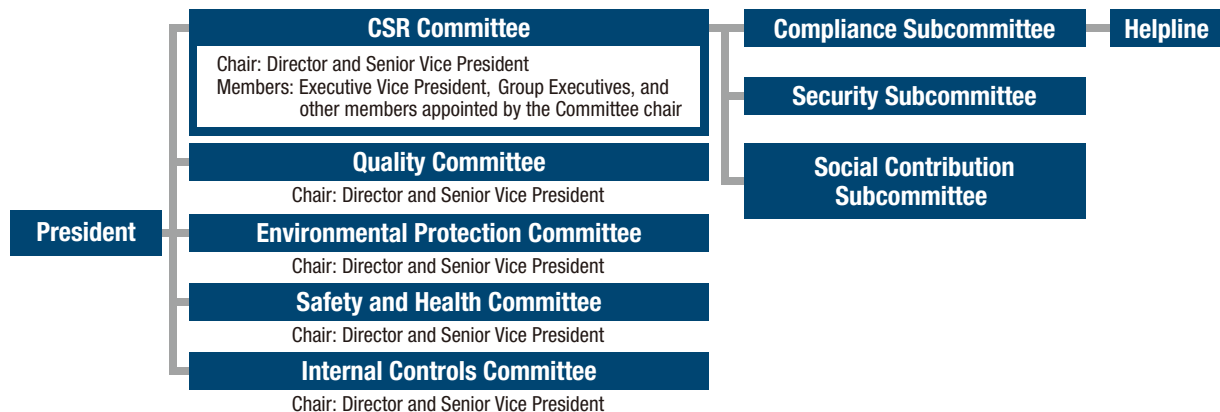
In establishing the CSR promotion items that constitute an integral part of our core values and principles along with the Corporate Philosophy and the Guidelines for Corporate Behavior, we took social trends and needs into consideration and developed systems for information disclosure and promotion.

In line with this policy, we will address the needs of the times appropriately, based on feedback from our stakeholders.

CSR Promotion Framework

To promote CSR activities, the NGK Group has established the CSR Committee, the Environmental Protection Committee, the Quality Committee, the Safety and Health Committee, and the Internal Controls Committee.

In terms of legal and corporate ethics compliance activities, the CSR Committee discusses items necessary to assist decision-making by the president and CSR Committee chair. It also conducts a wide range of activities, including providing support in matters determined to potentially have a substantial impact on the company, reviewing and evaluating the promotion plans of each subcommittee, and deliberating CSR-related items, determined to be important by the Committee chair.



Human Rights Initiatives

Having established respect for humanity in its Guidelines for Corporate Behavior, the NGK Group uses its intranet, which is available to all domestic Group company employees, to promulgate the United Nations “Universal Declaration of Human Rights” and “Guiding Principles on Business and Human Rights.” NGK also actively spreads awareness for protecting human rights by holding seminars on the subject.

Procuring Resources and Raw Materials Responsibly

The NGK Group conducts procurement activities that consider impacts on regional communities stemming from the use of raw materials (e.g. conflict minerals*) with the potential to cause social issues such as human rights violations and poverty, and takes steps to avoid using such materials when there is risk of adverse impact.

*Minerals including tin, tantalum, tungsten, and gold produced in the Democratic Republic of the Congo and surrounding countries, and used as a source of funding for armed conflict in the area.

Position on SDGs

The NGK Group is a signatory to the United Nations Global Compact, which advocates for independent action on the part of companies. We believe that addressing a broad range of social problems through our business activities, while measuring progress against indicators such as the Sustainable Development Goals (SDGs) adopted by the UN, is an important corporate social responsibility.

	Goals	Values provided by the NGK Group
	End poverty in all its forms everywhere	<ul style="list-style-type: none"> • Creating appropriate employment helps to end poverty • NGK's climate change countermeasures help mitigate natural disasters
	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	<ul style="list-style-type: none"> • The social infrastructure created by NGK products helps secure equal access to work opportunities
	Ensure healthy lives and promote well-being for all at all ages	<ul style="list-style-type: none"> • Ceramics for purifying automobile exhaust make exhaust gas clean
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	<ul style="list-style-type: none"> • Creating appropriate employment gives people the chance to have equal access to education
	Achieve gender equality and empower all women and girls	<ul style="list-style-type: none"> • The social infrastructure created by NGK products helps provide more opportunities for women to enhance their abilities • Securing equal opportunities for women to participate and be leaders in society
	Ensure availability and sustainable management of water and sanitation for all	<ul style="list-style-type: none"> • Ceramic membrane filters provide highly safe water • Ceramic membrane filters purify wastewater
	Ensure access to affordable, reliable, sustainable, and modern energy for all	<ul style="list-style-type: none"> • Insulators are indispensable to stable power supply • NAS[®] batteries allow stable supply of renewable energy • Ceramics for purifying automobile exhaust make exhaust gas clean, thus enabling clean usage of fossil fuels
	Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	<ul style="list-style-type: none"> • Creating appropriate employment and providing employees with a satisfying work environment contributes to economic growth
	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	<ul style="list-style-type: none"> • Ceramics used in electronics make ICT cheap and ubiquitous • Ceramics used in semiconductor manufacturing equipment let the semiconductor industry be the foundation for modern daily life • Metal products are widely used in mobile phones, automobiles, industrial equipment, and other devices that undergird modern life
	Reduce inequality within and among countries	<ul style="list-style-type: none"> • We prevent discrimination and take prompt and appropriate action when violations occur

	Goals	Values provided by the NGK Group
	Make cities and human settlements inclusive, safe, resilient, and sustainable	<ul style="list-style-type: none"> NAS® batteries enable innovation in urban energy management for the creation of sustainable cities
	Ensure sustainable consumption and production patterns	<ul style="list-style-type: none"> We efficiently use the natural resources used to make ceramics
	Take urgent action to combat climate change and its impacts	<ul style="list-style-type: none"> NAS® batteries aid in the fight against climate change by allowing stable supply of renewable energy
	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	<ul style="list-style-type: none"> Ceramic membrane filters purify wastewater to prevent marine pollution
	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	<ul style="list-style-type: none"> We protect biodiversity on land owned by NGK
	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels	<ul style="list-style-type: none"> We comply with the rules and regulations of the countries and regions in which do business, and ensure respect for and strict compliance with international treaties
	Strengthen the means of implementation and revitalize the global partnership for sustainable development	<ul style="list-style-type: none"> We encourage and promote effective partnerships among governments, corporations, and society as a whole

Targeted Stakeholder and Response Policies

In addition to promoting understanding regarding the NGK Group among customers, suppliers, shareholders, investors, regional communities, governments, international organizations, universities, research institutes, and employees, we are continuously improving our activities and initiatives through dialogue with all of our stakeholders.

In fiscal 2017, we again conducted the CSR Monitor Survey, which targets general consumers, and the Expectation Survey on CSR Promotion Actions, which targets our employees.

As a result of these surveys, it was revealed that among the NGK Group's CSR activities, general consumers are interested in the environment and global environmental conservation, while our employees expect our CSR activities to provide products that contribute to a better social environment and ensure a comfortable workplace where one's humanity is respected.

We will incorporate the opinions gathered through the surveys into our CSR reporting for next year and beyond, as well as our future CSR activities.



Connection with Customers

To earn and maintain the trust of customers, we engage in the creation of new value through the provision of products and services realizing global environmental conservation and social safety and peace of mind from a long-term and global perspective.

Connection with Suppliers

With a basic policy centered on the three principles of openness and fairness, partnership, and relationship with society, the NGK Group is engaged in fair, free, and transparent business transactions with the procurement partners in our supply chain. We also established a supplier helpline to provide unwavering support for important inquiries in an effort to build and maintain fair supplier relationships.

Connection with Shareholders and Investors

The NGK Group aims to meet expectations for enhanced corporate value through dialogues and efforts to disclose information pertaining to management, finance, products, and services in a timely and appropriate manner.

Connection with Regional Communities

We proactively engage in social contribution activities in response to community needs with the intent of becoming a corporate citizen trusted by society with concern for social issues in all countries and regions where we do business.

Connection with Governments and International Organizations

We proactively participate in international initiatives and other activities in order to realize mutual cooperation as key actors seeking to resolve social problems.

Connection with Universities and Research Institutes

Through research and educational activities based on industry-academia collaboration, we have been pushing forward with the development of scientific technologies and other technologies that will contribute to solving social problems.

Connection with Employees

The NGK Group strives to create a safe and comfortable workplace environment with respect for employee humanity. We also support the growth of human resources and fair treatment enabling each employee to maximize their skills.

Implementation Status of Stakeholder Engagement

Stakeholders	Objectives	Communication methods	Frequency
Customers (including general consumers)	Enhance customer services Improve quality	Official website	Regularly
		Contact desk	Regularly
		Participation in exhibitions	A few times a year
		Open innovation	Regularly
Suppliers	Realize fair, free and transparent transactions Exchange information with suppliers Establish better supply chain	Financial results presentations	Once a year
		Supplier helpline	Regularly
		Individual visits to suppliers in Japan and overseas	Regularly
Shareholders and Investors	Enhance corporate value	General shareholders meetings	Once a year
		Information sessions	Twice a year each in Japan and overseas
		Individual visits and interviews	Regularly
		Participation in IR events	Once a year
		Countermeasures for socially responsible investment (SRI)	Regularly
		Official website	Regularly
Regional Communities	Contribute to regional communities as a trusted corporate citizen	Collaborative activities with NPOs, etc.	Regularly
		Volunteer activities by employees	Regularly
		Social contribution activities in cooperation with labor unions	Regularly
		Invitation to plant tours and events	Regularly
Governments and International Organizations	Promote initiatives to solve social problems	Participation in international initiatives	Regularly
Universities and Research Institutes	Develop scientific technologies Develop technologies that will contribute to solving social problems	Joint research	Regularly
Employees	Respect the human rights of employees Develop safe and comfortable workplace environments Conduct surveys on workplace environment and employee satisfaction Inculcate corporate philosophy and policies	Company newsletter	Once a month
		<i>Global MIZUHO</i> English-version company newsletter	Twice a year
		Video news	Twice a month
		CSR Talk Live	Approximately 10 times a year
		Intranet	Regularly
		Labor-Management Advisory Board meetings / Regular Labor-Management Council meetings	Once a year / Twice a year
		Survey on workplace vitality	Once in two years
		CRS (Corporate Risk Survey)	Once a year
		Expectation survey on CSR promotion actions	Once a year
		Helpline	Regularly
		Hotline	Regularly

Environment

In addition to promoting the development and popularization of products and services that can help reduce the load on the environment, the NGK Group is endeavoring to preserve the global environment by improving manufacturing processes and developing and introducing manufacturing technology that has less environmental impact.

Activities covered

- NGK Headquarters, Nagoya Site, Chita Site, Komaki Site, Ishikawa Plant (does not include Tokyo Main Office, Osaka Branch, and six other sales offices)
- Group companies: 42 manufacturing-related consolidated subsidiaries (19 in Japan; 23 overseas)

NGK's Core Policy on the Environment

Recognizing that protecting the environment is a vital issue that all of humanity must face, the NGK Group formulated its Core Policy on the Environment in April 1996 based on Environmental Philosophy and Environmental Action Guidelines in order to bring its corporate activities into harmony with the environment. On the basis of this policy, the NGK Group works to reduce the environmental impact of business activities, and actively strives to help protect the environment by developing products and technologies to that end.

NGK's Core Policy on the Environment

Environmental Philosophy

Given its corporate philosophy—"NGK products and technologies must create new value and contribute to the quality of life"—NGK will contribute to tackling environmental issues through its "Triple-E" business segments of ecology, electronics, and energy to create a comfortable environment for future generations.

Guidelines for Environmental Action

1. Strive to develop, design, and manufacture products that contribute to the environment and products with low environmental impact.
2. Work to reduce the environmental impact arising from business activities. Conduct design reviews to scientifically study and evaluate the environmental impact of business activities.
 - Promote energy conservation measures for all processes and facilities, and make efforts to control CO₂ emissions.
 - Promote resource saving and recycling, and make efforts to control the generation of by-products.
 - Through the appropriate use and control of chemical agents, work to reduce the risks inherent in toxic substances.
 - Give precedence to environmentally friendly materials, parts, products, and facilities in procurement and purchasing, strengthening cooperative alliances with our business partners.
3. Enhance environmental management systems from a global perspective while continuously reducing our environmental impact.
4. Not only abide by environmental laws, regulations, and other requirements, but also institute voluntary standards and work to improve our own environmental conservation.
5. Provide environmental information to the public at the appropriate time and pursue dialogue with all stakeholders. Proactively develop social action programs. Also, engage in education and publicity in order to improve employees' environmental consciousness.

The site reports posted on the website contain details regarding the environmental impact of each of NGK Group's sites and manufacturing-related group companies both within Japan and overseas, as well as environmental conservation activities in which they are currently engaged.

<https://www.ngk-insulators.com/en/sustainability/sitereport/index.html>

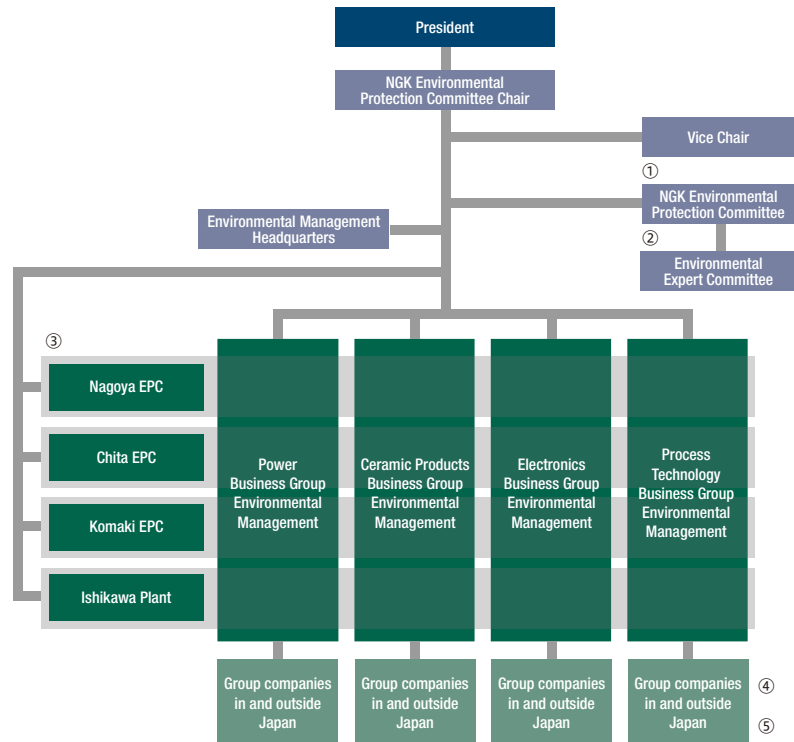
Environmental Management Frameworks and Environmental Management System

The NGK Group promotes environmental conservation activities in accordance with our Core Policy on the Environment through initiatives pertaining to environmental management frameworks and the Environmental Management System (EMS) implemented by global Group companies working in conjunction with one another.

Consolidated Environmental Management Promotion System

In addition to environmental management systems built independently at each site of NGK (Nagoya, Chita, Komaki, Ishikawa), we have established a consolidated management system to control environmental activities at all domestic and overseas Group companies under the leadership of each Business Group. The Five-Year Environmental Action Plan and the related annual plan are shared across the entire Group via the Business Groups to be incorporated into activity plans of each Group company.

To promote unified environmental management for the entire Group, annual liaison meetings are held for Group companies in Japan, while headquarters personnel visit Group companies overseas on a regular basis. Thus, we create interactive discussion and support opportunities to address issues facing each company.



① NGK Environmental Protection Committee

In principle, meets twice each year. Other meetings are held at the discretion of the chair.

Governing Structure

Chair	President makes decision in light of Executive Committee deliberations (As of July 2018, Director and Vice President)
Vice Chair	Appointed by NGK Environmental Protection Committee Chair (As of July 2018, General Manager of Environmental Management Dept.)
Members	Executive Vice President, Vice Presidents responsible for Headquarters Departments, Group Executives, General Managers, General Manager of Pollution Control at each site, General Manager of Environmental Management Dept., General Manager of Safety and Health Management, General Manager of Corporate Strategy Office, General Manager of Corporate Communications, General Manager of Human Resource Dept., General Manager of Group Compliance, General Manager of Finance & Accounting Dept., General Manager of Legal Dept., General Manager of General Affairs Dept., General Manager of Purchasing Dept., General Manager of Construction & Maintenance Dept., General Manager of Global Engineering Center, and others designated by the Committee Chair

② Environmental Expert Committee

In principle, meets twice each year. Meets before the NGK Environmental Protection Committee to review and discuss items to be reported to the committee.

Governing Structure

Expert Committee Chair	General Manager of Environmental Management Dept.
Vice Chair	General Manager of Construction & Maintenance Dept.
Members	General Manager of Business Planning Dept., persons in charge of promoting environmental activities in each division, Group Manager of Environmental Management Dept., others designated by the Expert Committee Chair

③ Environmental Committees at Each NGK Site (Nagoya Site, Chita Site, Komaki Site, Ishikawa Plant)

In principle, meets twice each year in each area. Thoroughly conveys matters determined by the NGK Environmental Protection Committee, and communicates and discusses issues and topics in each area (all four areas meet twice each year for a total of eight meetings).

④ Sharing Information with Domestic Group Companies

The Environmental Performance Questionnaire is used to conduct an annual survey into the status of compliance with environmental laws at each company. The annual liaison meeting for all Group companies that are involved in manufacturing is also held. This enables the Group-wide policy on environmental initiatives to be conveyed to manufacturing Group companies and each company's environmental management status and information on effective initiatives to be shared, thus promoting the unification of domestic Group company environmental conservation activities.

⑤ Sharing Information with Overseas Group Companies

The Environmental Performance Questionnaire is used to conduct an annual survey into the status of compliance with environmental laws at each company. Group companies that are involved in manufacturing receive regular audits to monitor management systems and conditions. The Group provides support for improving corporate governance structure and facilities as required.

History of NGK's Environmental Activities

April	1972	Environmental Protection Committee and Environmental Preservation Office (currently, Environmental Management Dep.) established	March	2004	Three-year and long-term plans for reduction of CO ₂ emissions instituted
June	1992	Waste Countermeasures Commission established	March	2005	Company-wide medium-term plan for the reduction in by-products established
March	1993	NGK's Voluntary Plan for Environmental Conservation established	April	2005	Environmental Action Guidelines revised; Green Procurement Guidelines revised
December	1994	Chlorofluorocarbons (CFCs) and 1,1,1-trichloroethane abolished	October	2005	Third-party review of environmental performance begun
February	1995	Internal environmental audit conducted	April	2006	2nd Five-Year Environmental Action Plan established
April	1996	NGK's Core Policy on the Environment established	September	2006	Initiated environmental surveys of overseas Group companies
December	1996	CO ₂ Countermeasures Commission established	May	2007	Introduction of a consolidated goal for CO ₂ and by-products for domestic Group companies
March	1998	NGK's three production bases (Nagoya, Chita, and Komaki) simultaneously received ISO 14001 certification	April	2008	Establishment of the Environmental Management Department
March	1999	Environmental Report published	January	2009	Introduction of goals to reduce CO ₂ by-products, and chemical substances for overseas Group companies
April	1999	Environmental accounting introduced	January	2010	Expanded scope of goals to reduce CO ₂ by-products, and chemical substances for overseas Group companies
October	1999	Green Purchasing Commission established	April	2011	Formulated the 3rd Five-Year Environmental Action Plan, "by-products" renamed "discarded materials."
November	1999	Environmental audits of domestic Group companies started	March	2012	Three NGK sites (Nagoya, Chita, and Komaki) received integrated ISO 14001 certification
February	2000	Environmental Partnership Organizing Club (EPOC) established and active participation therein begun	March	2013	The Ishikawa Plant received ISO 14001 certification (joint certification with three NGK sites)
October	2000	Chemical Substances Safety Committee established; Chemical Substances Management System introduced	April	2013	NGK established the Environmental Expert Committee as the authority handling matters related to CO ₂ discarded materials and other important environmental management items (created through the combination of the former CO ₂ Countermeasures and Recycling Promotion Commission)
March	2001	1st Five-Year Environmental Action Plan established	August	2013	Conducted environmental liaison meeting at overseas Group companies as part of attempts to strengthen global environmental management
April	2001	Compilation of environmental performance data for domestic Group companies started	February	2015	NAS Battery wins the Gold Prize at the 2015 Aichi Environmental Awards
October	2001	Operating of Recycling Yard begun	April	2016	Formulated the 4th Five-Year Environmental Action Plan
January	2002	Compilation of environmental performance data for overseas Group companies started	January	2018	NGK's ISO 14001 certification upgraded to 2015 version
April	2002	New "Green Management" three-year management plan instituted			
April	2003	Moves made toward a full business group environmental management system; "Waste Countermeasures Commission" renamed "Recycling Promotion Commission" and "wastes" renamed "by-products."			

Environmental Management System (ISO 14001, etc.) Initiatives

The NGK Group encourages the acquisition of ISO 14001 or third-party certifications meeting this standard to systematically and continuously develop its environmental conservation activities in line with NGK's Core Policy on the Environment. Under this initiative, a total of 42 manufacturing sites, including those in Nagoya, Chita, Komaki, and Ishikawa, have been certified appropriately. We will work to expand the certification initiative within the Group, particularly targeting new plants. The Group will make effective use of these environmental management systems going forward with the intention of reinforcing its environmental management.

Certification of Environmental Management System

Categories		No. of manufacturing bases	No. of bases certified
NGK		4	4
Domestic Group	Power Business	6	3
	Ceramic Products Business	5	5
	Electronics Business	12	12
Overseas Group	Power Business	4	3
	Ceramic Products Business	10	8
	Electronics Business	7	7

The counting method of manufacturing bases was changed in fiscal 2016.

Environmental Audits

NGK conducts internal audits and external audits (surveillance by third parties) of the environmental management system at the Nagoya, Chita, and Komaki sites, as well as the Ishikawa Plant. Group companies also conduct these same internal audits, and external reviews of the environmental management systems are conducted by external auditors at all Group companies.

In fiscal 2017, in the same way as with the previous year, there were no significant findings. In the event of a significant finding, the relevant division and Environmental Management Dept. work together to review and implement countermeasures, as well as inform environmental committees in each area in an attempt to horizontally deploy these measures.

Environmental Risk Management

At the NGK Group, each manufacturing site has individually established environmental management systems to prevent environmental pollution. Each site periodically performs self-evaluation of its environmental risk management activities and reports evaluation results to NGK headquarters. Headquarters confirms the results and gives advice and support for improvement, as necessary. Thus, we are working to improve the management level for the entire Group.

Regulatory Compliance

NGK conducts monitoring and assessments as well as vigorous control of exhaust and wastewater produced from its sites, observing relevant regulations and environmental preservation-related and other agreements with control authorities. Additionally, we organize environmental management specialist seminars on a regular basis for all Group companies in and outside of Japan to keep responsible persons updated on related topics, thereby enhancing our capabilities to prevent environmental pollution.

Environmental Patrols and Emergency Response Drills

NGK implements environmental patrols in line with annual plans to prevent environmental pollution and conducts response drills based on emergency scenarios to minimize damage. In fiscal 2017, environmental patrols were conducted at the Nagoya, Chita, and Komaki sites and the Ishikawa Plant to prevent atmosphere and water pollution, ensure the appropriate management of chemical substances, and suppress noise and vibrations. Response drills based on emergency scenarios were also conducted at these four areas. Going forward, NGK will continue to proactively engage in patrols and drills in an attempt to improve operational methods and mitigate environmental risks.

Activities Conducted in Fiscal 2017

		Atmosphere	Water	Noise and vibrations	Chemical substances
Nagoya	Environmental patrols	3	2	2	2
	Emergency response drills	3	2	1	—
Chita	Environmental patrols	3	1	2	1
	Emergency response drills	—	3	6	—
Komaki	Environmental patrols	2	1	2	1
	Emergency response drills	—	9	9	—
Ishikawa	Environmental patrols	—	2	2	2
	Emergency response drills	—	2	2	—

Note: "—" indicates emergency response drills were considered of low importance and not conducted.

Strengthening of Global Environmental Management

In accordance with the Guidelines for Environmental Action, the NGK Group horizontally deploys domestic environmental impact reduction initiatives in overseas Group companies while creating mechanisms to strictly comply with amendments to environmental laws and regulations to propel our global environmental management to the next level.

Mitigating Environmental Risks throughout the Group

All NGK Group companies in Japan and overseas have completed acquisition of ISO 14001 or third-party certifications meeting this standard and implement environmental management in line with environmental management systems.

NGK shares information regarding changes in domestic environmental laws and regulations with Group companies and has created a structure to ascertain the status of responses to these changes. Overseas, NGK headquarters is enhancing its ability to regularly ascertain the status of responses and management in terms of important legal and regulatory system revision information in the countries and regions where Group companies are located.

Additionally, in fiscal 2017, we developed trend-based risk prevention systems using historical monitoring data for atmospheric, water, and other types of environmental pollution, and introduced the systems to all Group companies in and outside of Japan. Also, NGK headquarters sent environmental management personnel to Group companies overseas to perform on-site environmental risk assessments and, for identified risks, countermeasures have been completed at relevant sites. We will continue with these efforts to mitigate environmental risks throughout the Group.

Strengthening Environmental Management Linked to Business Planning

The NGK Group aims to build an environmental management system that can cope with changes in both our business plan and the state of the social environment.

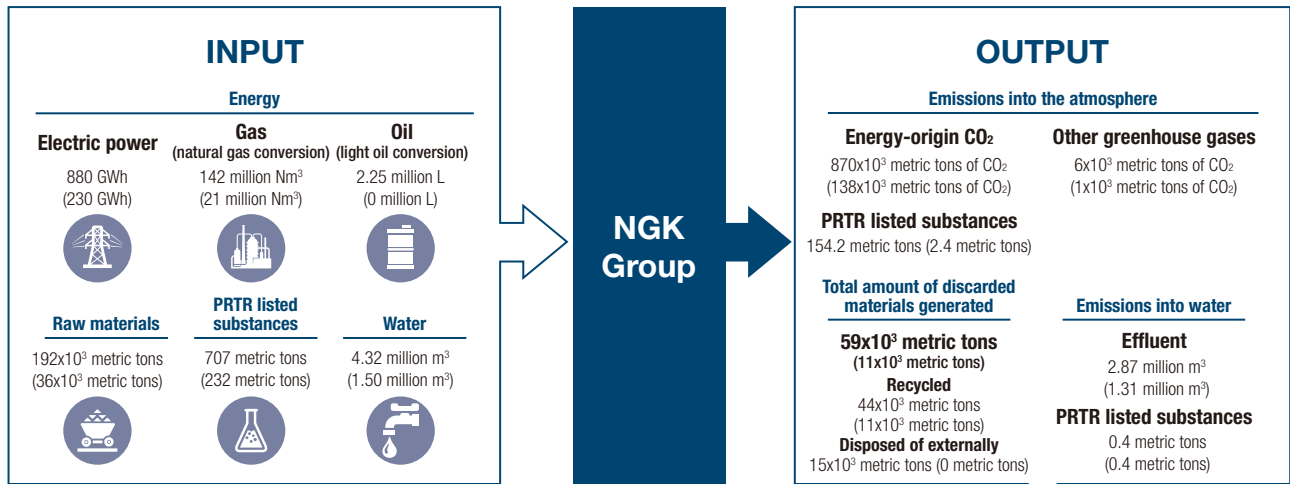
Initiatives aimed at reducing environmental impact in accordance with business plans include conducting biannual forecast estimates and achievement evaluations in each business group, product line, and manufacturing base to determine which initiatives to pursue next.

These efforts include the establishment of the Environmental Expert Committee under the NGK Environmental Protection Committee as a company-wide decision-making body. The Environmental Expert Committee facilitates discussions among managers from planning and production divisions who formulate and promote actual business planning in each business division, strengthening the company-wide environmental management system. Going forward, we will continue to strengthen management integration with the aim of promoting environmental management that combines global environmental protection and corporate growth.

Overall Perspective of Environmental Impact

The diagram below shows aggregate inputs to and outputs from manufacturing operations of the entire NGK Group at all domestic and overseas sites. Inputs represent data for raw materials and energy etc. and outputs for manufactured products and services as well as substances that are discharged into the atmosphere and into water.

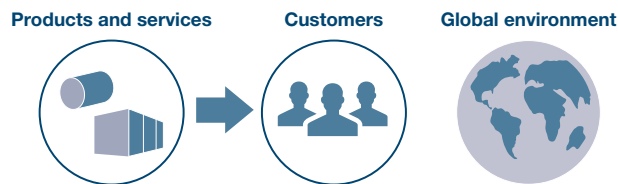
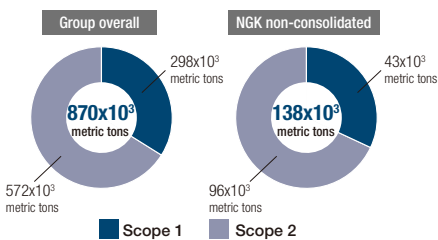
NGK Group Material Balance (Input and Output)



Items in parenthesis indicate NGK input on a non-consolidated basis.

Items in parenthesis indicate NGK output on a non-consolidated basis.

Breakdown of energy-origin CO₂ emissions



Notes:

1. NGK CO₂ emissions on a non-consolidated basis were calculated based on the amount of electric power, city gas, and LNG purchased by NGK. When calculated using the CO₂ conversion factor determined in the Enforcement Ordinance for the Act on Promotion of Global Warming Countermeasures (revised in May 2016), the fiscal 2017 energy-origin actual CO₂ emissions for NGK on a non-consolidated basis were 155x10³ metric tons.
2. Environmental performance values in this report have been rounded off for convenience; therefore the sum of individual values may not match the totals.
3. "Discarded materials" indicates the total amount of industrial waste and valuables.

INPUT

1. Energy

Electric power:

Consumption amount of electric power

Gas: Consumption volume of each type of fuel gas converted into natural gas volume = Σ (Consumption volume of each fuel gas \times Unit heating value of each fuel gas / Unit heating value of natural gas)

<Unit heating value of fuel gas>

Natural gas: 40.9 MJ/Nm³ City gas: 45.0 MJ/Nm³

LPG: 50.2 MJ/kg LNG: 54.5 MJ/kg

Oil: Consumption volume of each type of fuel converted into light oil volume = Σ (Consumption volume of each fuel \times Unit heating value of each fuel / Unit heating volume of light oil)

<Unit heating value of fuel>

Light oil: 38.2 MJ/L Fuel oil A: 39.1 MJ/L Kerosene: 36.7 MJ/L

2. Water

Total consumption volume of city water, industrial water, well water, and rainwater

3. PRTR Substances

Total amount handled of Japan's PRTR Type 1 listed substances

4. Raw materials

Total weight of raw materials used in product manufacturing

OUTPUT

5. Energy-origin CO₂ emission volume

Energy-origin CO₂ emission volume = Σ (Consumption of each energy \times CO₂ conversion factor of each energy)

<CO₂ conversion factor of energy>

(Unit of electric power factor: kgCO₂/kWh Unit of fuel factor: kgCO₂ / fuel unit)

Electric power

Japan: 0.42; United States: 0.709; Belgium: 0.292; France: 0.061; Poland: 0.986; South Africa: 1.096;

China: 0.983; Thailand: 0.687; Indonesia: 0.790; Australia: 1.390; Mexico: 0.741

Fuel Natural gas (Nm³): 2.02; City gas (Nm³): 2.29; LPG (kg): 3.007; LNG (kg): 2.70;

Light oil (L): 2.64; Fuel oil A (L): 2.677; Kerosene (L): 2.49; Industrial steam (MJ): 0.06

6. Emission volume of other greenhouse gases

Emission volume of other greenhouse gases = Active mass \times Emission factor \times Global warming potential

<Global warming potential>

CO₂: 1; CH₄: 25; N₂O: 298; HFC: Differs by type; PFC: Differs by type; SF₆: 22800; NF₃: 17200

7. Effluent

Total amount of effluent excluding rainwater

8. PRTR Type 1 listed substances

Emissions into water: Total emission amount of Japan's PRTR Type 1 listed substances into public waters

Emissions into atmosphere: Total emission amount of Japan's PRTR Type 1 listed substances into atmosphere

9. Total amount of discarded materials generated

Total amount of discarded materials generated = Externally disposed amount*¹ + Externally recycled amount

Recycled amount: Externally recycled amount = Paid disposal*² + Valuable amount (selling off)

*¹ Externally disposed amount: Direct disposal by landfill, or simple incineration

*² Paid disposal: Outsourcing disposal and paying for recycling

Five-Year Environmental Action Plan

The NGK Group has established the Fourth Five-Year Environmental Action Plan (2016–2020). To achieve the goals of the Plan, we are promoting environmental activities, setting annual targets.

Outline of the Fourth Five-Year Environmental Action Plan (2016–2020)

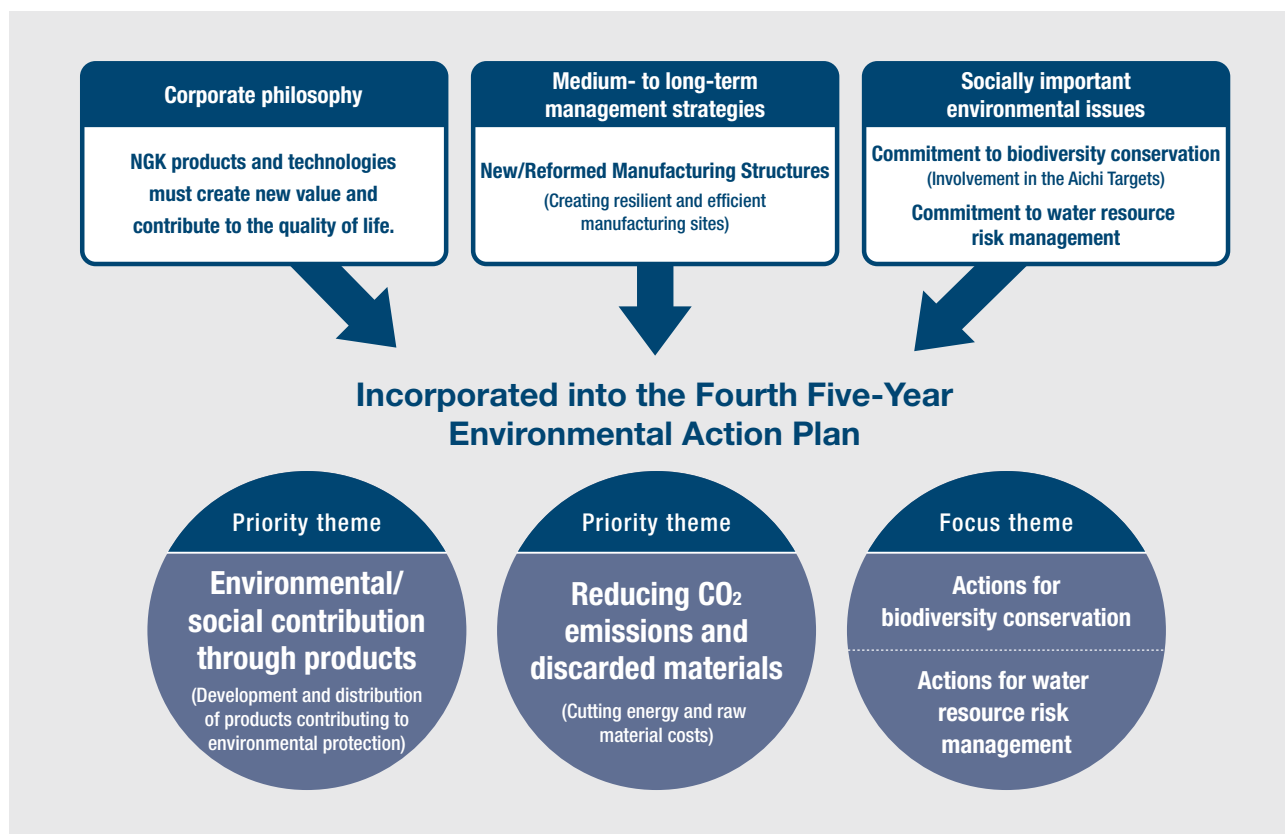
The NGK Group organizes environmental initiatives by creating five-year action plans. The Fourth Five-Year Environmental Action Plan, initiated in fiscal 2016, has been formulated to broadly encompass major global environmental challenges that businesses are expected to take, and to select two key issues each for two groups of themes, namely, priority themes and focus themes.

The two priority themes are: environmental/social contribution through products; and reducing CO₂ emissions and discarded materials. The first priority theme directly reflects the core concept of the corporate philosophy, while the other theme closely relates to NGK’s medium- to long-term initiative of New/Reformed Manufacturing Structures for increasing competitiveness. For focus themes, we have also set two issues: biodiversity conservation and water resource risk management/response, both being major challenges for which socially responsible corporate action is required with greater urgency.

Base Year, Target Year, Control Scope

Base Year: Fiscal 2013; Target Year: Fiscal 2020






The new Five-Year Environmental Action Plan has been designed to correspond with the business initiative of New/Reformed Manufacturing Structures. Accordingly, the base year and target year of the Plan have been set to coincide with the initiative. In principle, activities will be managed on a consolidated basis, embracing those based in and outside of Japan, in place of the previous method of managing domestic and overseas activities separately. The consolidation method has been adopted to improve management efficiency and effectiveness in response to the recent changes in our global production output structure, particularly increased amounts from overseas manufacturing sites as well as from production chains through multiple global locations.



Five-Year Environmental Action Plan Progress Report

The initiatives planned under the Fourth Action Plan and their progress (targets and results for fiscal 2017; targets for fiscal 2018 and 2020, the final year) are summarized in the table below.

In fiscal 2017, the annual goals for nearly all of the cumulative quantitative goals were achieved, while progress on other items proceeded according to the plan established at the start of the period. In particular, the efforts undertaken by NGK's business groups produced results for basic unit per net sales for discarded materials that significantly exceeded the annual goal. Progress on the current five-year plan is proceeding steadily at a pace above that anticipated at the time of the plan's creation. Notably, the target reduction rate against BAU for CO₂ and discarded materials was achieved ahead of schedule and was, therefore, adjusted upwards. For fiscal 2018, as well, the NGK Group is working in concert to undertake environmental activities that will enable target goals to be met.

Category	Item	KPI	Fiscal 2017			Fiscal 2018	Fiscal 2020	
			Target	Result	Self-evaluation*1	Target	Target	
Environmental/social contribution	 Environmental/social contribution through products	Develop and distribute products contributing to environmental protection	Sales growth (%) (consolidated)	Increase by 30% from fiscal 2013	Increased by 37% from fiscal 2013	○	Increase by at least 43% from fiscal 2013	Increase by at least 60% from fiscal 2013
		Promote green procurement	Plan progress (%)	At least 99% of NGK's suppliers in Japan agree to comply with the CSR Procurement Guidelines	99.9% agreed (100% including suppliers who partially agreed)	○	At least 99% of NGK's suppliers in Japan agree to comply with the CSR Procurement Guidelines	Maintain in Japan, expand overseas
	 Promotion of environmental communication	Contribute to local communities	Plan progress (%)	Send instructors to guest lecture programs, participate in local environmental protection activities	Sent instructors to local children's centers, participated in local environmental protection activities	○	Send instructors to guest lecture programs, participate in local environmental protection activities	Continually enhance actions partnering with communities
		Raise environmental awareness	Plan progress (%)	Provide environmental education for employees, establish employee communication on environmental themes, encourage participation in environmental events	Provided training programs by job grade, organized CSR Talk Live, installed "green curtains"	○	Provide environmental education for employees, establish employee communication on environmental themes, encourage participation in environmental events	Continually enhance environmental training and information disclosure
	 Conservation of biodiversity	Promote actions based on biodiversity conservation guidelines	Plan progress (%)	Continue biodiversity survey at company-owned site, promote employee participation in My Action Declaration project	Exhibited survey results on-site, 4300 employees participated in My Action Declaration project	○	Extend My Action Declaration project to domestic Group companies	Expand and enhance content of Aichi Targets actions
Environmental impact reduction	 Prevention of global warming	Reduce CO ₂ emitted from manufacturing	Basic unit per net sales (consolidated)	Reduce by 11% from fiscal 2013	Reduced by 14% from fiscal 2013	○	Reduce by 14% from fiscal 2013	Reduce by 20% from fiscal 2013
			Reduction rate against BAU (%)**2 (consolidated)	Reduce by at least 15% from fiscal 2013	Reduced by 18% from fiscal 2013	○	Reduce by 18% from fiscal 2013	Reduce by 18% from fiscal 2013 (upward revision from initial 15% target)
		Reduce CO ₂ emitted from supply chains	Basic unit per transport volume**3 (non-consolidated)	Reduce by 1% per year on five-year average**4	Increased by 4.5% per year on five-year average**4	×	Reduce by 1% per year on five-year average**4	Reduce by 1% per year on five-year average**4
	 Effective use of resources	Reduce discarded materials emitted from manufacturing	Basic unit per net sales (consolidated)	Reduce by 17% from fiscal 2013	Reduced by 28% from fiscal 2013	○	Reduce by 28% from fiscal 2013	Reduce by 30% from fiscal 2013
			Reduction rate against BAU (%)**2 (consolidated)	Reduce by at least 19% from fiscal 2013	Reduced by 22% from fiscal 2013	○	Reduce by 23% from fiscal 2013	Reduce by 23% from fiscal 2013 (upward revision from initial 20% target)
		Promote resource recycling	Recycling rate (Japan)	At least 99%	99.1%	○	At least 99%	Maintain at least 99%
Manage and respond to water resource risks	Plan progress (%)	Conduct third-party water risk surveys	Conducted surveys at 6 sites	○	Continue water risk surveys, give feedback on survey results to bases	Strengthen actions by production bases for evaluating risks and streamlining water use		

Notes:

*1: Self-evaluation standards for achievement level: ○: Target achieved; ×: Target not achieved

*2: Reduction rate against BAU (business as usual) indicates the percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions. By not incorporating the influence of foreign exchange movements and other factors, this indicator allows a direct grasp of the efforts by each site.

*3: NGK basic unit per transport volume expresses in metric ton-kilometers the amount of crude oil equivalent fuel used.

*4: Based on the computation criteria stipulated in the Act on the Rational Use of Energy.

Creating Products That Contribute to the Environment

The NGK Group considers the provision of products and services that contribute to a better social environment to be one of its most important missions. For nearly a century since its founding, NGK has made use of accumulated technologies to develop and provide products and technologies that reduce burdens on the global environment.

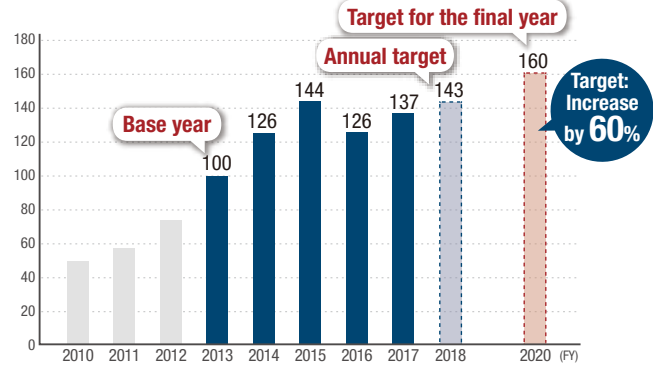
Development and Distribution of Products Contributing to Environmental Protection

Under our fourth Five-Year Environmental Action Plan initiated in fiscal 2016, as a top priority, NGK is committed to the development and distribution of products contributing to environmental protection. We aim to achieve a 60% increase in sales of products that contribute to environmental protection compared with figures for fiscal 2013 (and maintain the sales percentage for products contributing to environmental protection at over 50% of all products) by fiscal 2020, the final year of the Five-Year Plan. Currently, although we market seven products that contribute to environmental protection, as detailed below, when we develop new products that meet our internal criteria, at such point we will add them to the list.

In fiscal 2017, we achieved sales growth of 37% from fiscal 2013, exceeding the annual target of 30%. In fiscal 2018, in addition to endeavoring to expand sales of such products, we will continue to make the effort to develop more products to protect the environment, such as fuel cells.

Sales growth for products contributing to environmental protection (NGK Group)

Sales growth (%)*



*Figures are indexed with fiscal 2013 set at 100.

Products Contributing to Environmental Protection

HONEYCERAM®

HONEYCERAM is a ceramic substrate for catalytic converters to purify harmful contents in the exhaust of automobiles. The product's honeycomb structure is effective for carrying the catalyst to detoxify harmful substances by chemical reaction.

Since the launch of its mass production in 1976, the product has been supplied all over the world for many years as an essential component for meeting automobile exhaust gas regulations, which have become increasingly more stringent and wider in scope. Production has grown to record cumulative shipment exceeding 1.4 billion units, while manufacturing bases have expanded to a current total of eight countries in Europe, North America, Asia, and Africa. HONEYCERAM is an indispensable component of clean vehicles.

NGK's HONEYCERAM eliminates a total of four million metric tons of NOx per annum*1, equivalent to double the annual NOx emissions in Japan*2.



NOx elimination: 4 million metric tons annually

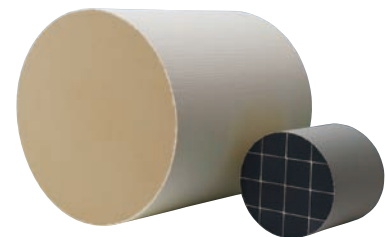
*1 Assumption based on installation of exhaust gas system in new cars that are not equipped with such systems

*2 Source: OECD Environmental Statistics (2012)

Diesel Particulate Filters (DPF)

The DPF is a porous ceramic filter used worldwide in the exhaust systems of diesel vehicles. With a pore structure, the filter ensures particulate matter (PM) is captured to purify the exhaust emitted from diesel vehicles. NGK is the only company to produce two types of DPFs based on both cordierite and silicon carbide. NGK's ceramics technologies support further developments for diesel vehicles.

The honeycomb structure, where the inlet and outlet of the through-holes are alternately sealed, enables the thin ceramic walls to efficiently capture PM while exhaust passes through.

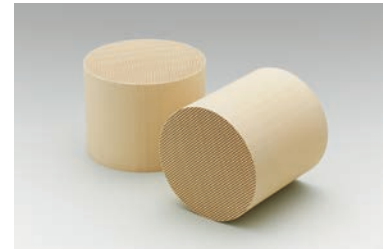


Eliminates up to 99% of PM

Gasoline Particulate Filters (GPF)

GPFs are ceramic filters that remove particulate matter (PM) from the exhaust of gasoline-powered vehicles. We developed this filter based on diesel particulate filter (DPF) technology, and succeeded in producing a GPF that can achieve high performance (captures more PM) and low pressure loss (lower fuel costs and higher output) at the same time through the use of our proprietary micropore creation and control technologies. We were the first to commercialize a GPF in 2012, and commenced mass production in January 2016 at one of our subsidiaries.

As automobile emission regulations throughout the world become stricter, we expect that demand for GPFs will increase. We are therefore proceeding with investment in GPF production facilities in Poland and China.



NOx Sensors

NGK developed the world's first in-vehicle sensor to measure concentrations of nitrogen oxides (NOx) in exhaust in real time with high precision. Specifically, the sensor is capable of measuring NOx concentration at the parts per million (ppm) level and can thus detect even very small amounts of the noxious substance. The sensor supports precise control of the exhaust purification device used in diesel vehicles, which leads to a reduction in NOx emissions and helps to promote the use of clean diesel vehicles.



NAS[®] Batteries

One of the most frequent uses of the NAS battery is for stabilizing the supply of renewable energy. While electricity from renewable sources, such as wind and solar power, is clean and, in principle, unlimited, its major limitation is that its output is affected by weather conditions, resulting in supply instability. The NAS battery resolves this limitation by storing excess renewable energy when generation exceeds demand, and supplying the stored energy to the grid when renewable output is low or demand is high. NAS systems enable the global growth of stable renewable energy.



NGK was the world's first manufacturer to commercialize the NAS battery megawatt-class storage system. Featuring a large capacity, high energy density, and long life, the battery can support the reliable, long-term stable supply of electricity. Also, the NAS system allows for a more compact housing compared with conventional lead-acid batteries.

NAS systems are the world's most popular grid-scale battery storage

Installed at over 200 locations worldwide with a 530,000 kW capacity

(As of June 2017)

Low-Level Radioactive Waste Treatment Systems

NGK has developed a wide range of systems to safely treat low-level radioactive waste generated from nuclear facilities and has supplied these systems to nuclear power stations and related facilities across Japan. The systems are developed utilizing NGK's proprietary treatment technology and high-performance filter-based dust collection technology.

We undertake a variety of engineering projects including design, manufacturing and site construction, and also provide a long-term maintenance service to deliver stable and high-level radioactive decontamination. NGK thereby provides essential support for the safe and stable operation of nuclear facilities.

In addition, we focus on the development of new systems for treating various types of radwaste expected to be generated from the decommissioning and dismantling of aging nuclear reactors.



Importance of Treating Radioactive Waste

When treating and disposing of waste generated in radiation-controlled areas, including nuclear power stations, it is critically important to prevent the spread of radioactivity via the release of radioactive matter. This requires special treatment and disposal methods that differ from those for general waste.

Wavelength Control Drying Systems

Our wavelength control drying system uses a proprietary heater unit developed in-house to promote the evaporation of solvents.

This system uses specific infrared frequencies to effectively facilitate evaporation, shortening drying time to approximately $\frac{1}{2}$ to $\frac{1}{3}$ of that required for conventional drying methods using heat, and reducing power consumption by 30 to 50%. It is also possible to suppress binder segregation, which is an expression of variations in concentration that occur due to drying of the soluble component in films during drying, by 30 to 40% (in-house binder segregation study).



Preventing Global Warming

The NGK Group strives to reduce CO₂ emissions, a major cause of global warming, setting reduction targets for the entire Group, including its manufacturing sites in and outside of Japan.

Reducing CO₂ Emissions Associated with Manufacturing Activities

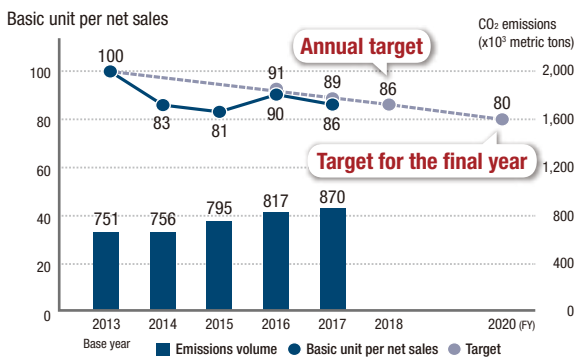
By creating and implementing annual improvement plans in line with the business plans of each of our manufacturing sites both within Japan and overseas, the NGK Group has been making steady progress toward achieving the CO₂ emissions reduction targets set under our Five-Year Action Plan.

Fiscal 2017 saw a large new factory come online overseas and the commencement of mass production of new products, resulting in a temporary increase in CO₂ emissions. Yet despite this and the strict annual targets that we had set in the Five-Year Action Plan, we were still able to exceed those reduction targets. This was thanks to carrying out more reduction efforts across all manufacturing divisions and minimizing startup losses. Furthermore, the reduction rate against BAU, an indicator newly introduced under the Five-Year Action Plan to help visualize the effect of measures to reduce emissions, was achieved ahead of schedule, thanks to steady ongoing progress backed by a significant improvement in the basic unit per production volume. We have therefore revised target values upward, aiming for a further improvement.

For fiscal 2018, although there are negative elements, such as the planned opening of a new factory in Japan, we will intensify our efforts to achieve our reduction targets under the Five-Year Action Plan.

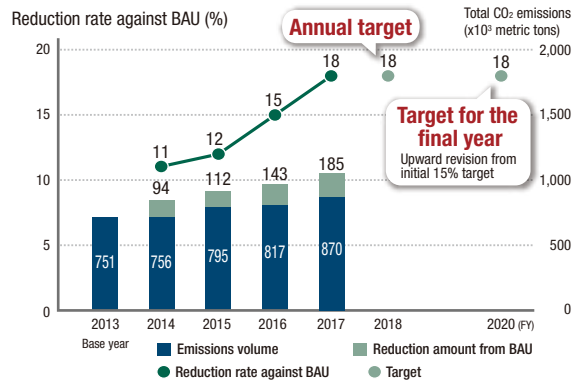
Believing that preventing future global warming is one of our most important duties as a company, from a long-term perspective we have already started deliberating on how to further reduce CO₂ emissions after the end of our current Five-Year Action Plan. As part of this we are considering where we want to be as a company during the period between 2030 and 2050, and the policies that we will need to implement to realize that.

CO₂ emissions / basic unit per net sales* (NGK Group)



*Basic unit per net sales calculated with the value in fiscal 2013 set at 100.

CO₂ emissions / reduction rate against BAU* (NGK Group)

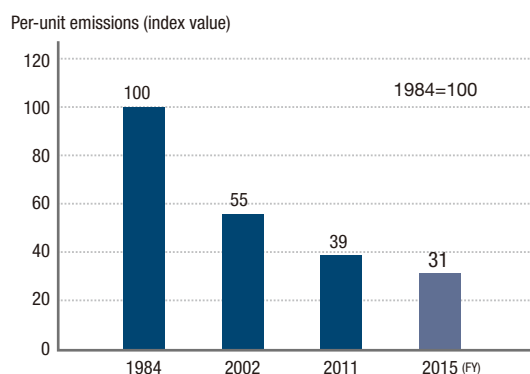


*Reduction rate against BAU: The percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions.

Adoption of Environmentally Friendly Production Processes

Through the introduction of highly efficient equipment and the promotion of the collection and use of exhaust heat and improved production efficiency, the NGK Group makes efforts to reduce environmental impacts resulting from production. Also, our Reformed Manufacturing Structures aimed at enhancing competitiveness significantly contribute to the realization of eco-processes. We will create further advanced eco-processes through our New/Reformed Manufacturing Structures. (See the graph on the right for change in CO₂ emissions from continuous kilns, which constitute major production equipment at NGK.)

Change in CO₂ emissions from continuous kilns by year of introduction



Measures to Reduce CO₂ Emissions and Effects

As we continue to expand overseas manufacturing, the NGK Group is particularly striving to raise manufacturing efficiency at our overseas sites in order to reduce the CO₂ emissions of the Group as a whole. We have made steady progress by introducing the innovative manufacturing processes and improvements to facilities and operations that we have implemented to date in Japan in our overseas manufacturing sites, as well as promoting energy-saving activities for general-purpose equipment.

In fiscal 2017, these initiatives achieved an annual CO₂ reduction effect of approximately 22,000 metric tons (a reduction rate of 2.4%), 60% or more of which was achieved by improvements carried out at our overseas sites.

Examples of initiatives aimed at reducing CO₂ emissions

Category	Measures	Effects
Highly efficient manufacturing processes	Main production efficiency initiatives at overseas sites <ul style="list-style-type: none"> • Introduction of innovative production processes • Facility improvements • Operational improvements 	CO ₂ reduction effect (22,000 metric tons) Japan: 7,800 metric tons Overseas: 13,800 metric tons
Group company energy-saving diagnostics	Promoted energy savings at overseas sites <ul style="list-style-type: none"> • An English version of the voluntary energy-saving guidelines and a best practice brochure created and distributed to overseas sites • Headquarters staff visited overseas sites and conducted activities with local employees 	Of which <ul style="list-style-type: none"> • Production process improvements Japan: 5,000 metric tons Overseas: 12,400 metric tons
General-purpose equipment energy-saving activities	Horizontally deployed main improvements <ul style="list-style-type: none"> • Replaced boilers with more efficient models • Eradicated air and steam leaks from plumbing • LED lighting • Renewed air-conditioning equipment and eliminated wasteful air conditioning 	<ul style="list-style-type: none"> • General-purpose equipment energy savings Japan: 2,700 metric tons Overseas: 1,400 metric tons

Energy-Saving Activities for General-Purpose Equipment and Buildings

The NGK Group has been actively promoting energy-saving activities in relation to general-purpose equipment, such as lighting, air conditioners, boilers, and compressors. The headquarters plays a central role in this in terms of sharing know-how among different manufacturing locations, thereby achieving more efficient activities.

Whenever our buildings are built or altered, we ensure that large-scale energy-saving measures and ZEB (zero energy building) principles are incorporated.

(1) Headquarters Supporting Energy-Saving Activities at Overseas Manufacturing Sites

The headquarters Engineering Department has, over the years, sent personnel to overseas manufacturing sites to perform energy audits and, as necessary, help local staff develop and carry out effective energy-saving measures using the know-how gained from practices in Japan. These efforts have produced solid results at overseas companies, including NGK Insulators Tangshan. (See “Global Warming Countermeasures Taken by Group Companies.”)

(2) Creating and Distributing a Printed Version of the Energy-Saving Brochure and Guidelines

We have created a printed version (Japanese, English) of our energy-saving guidelines and brochure of best practices, both of which were previously available only in digital formats. Copies have been distributed to each manufacturing site in and outside of Japan to be kept handy at worksites for easy reference. This is expected to help enhance activities to reduce CO₂ emissions.



(3) Efforts to Conserve Energy within Buildings

Whenever there is the opportunity to build or renovate a building, we actively endeavor to utilize high-efficiency equipment and introduce renewable energy, and carefully consider each location so as to be able to effectively utilize any natural advantages, such as low-temperature waste heat from adjacent factories and natural ventilation/lighting, to achieve significant energy savings. The administration/welfare wing, which is currently under construction in Mizuho, Nagoya, is going to be a zero energy building (ZEB) that achieves a reduction in CO₂ emissions of 54% from the official standard. Our initiative to use pioneering CO₂ reduction technology for this building was recognized by the Japanese government, and the construction project was adopted as a Leading Sustainable Building Project (CO₂ Reduction) by the Ministry of Land, Infrastructure, Transport and Tourism.

We have many more construction/renovation projects lined up as part of our plans to reorganize corporate structure and update old buildings, all of which will include energy saving and ZEB measures.



Concept drawing for the administration/welfare wing in Mizuho (scheduled for completion in June 2019)

Global Warming Countermeasures Taken by Group Companies

NGK Stanger Pty. Ltd.

NGK Stanger collects and recycles gas-filled switches that are being disposed of by clients. These units contain sulfur hexafluoride (SF₆) for insulation purposes, and as it has a very high global warming potential, the company collects all SF₆ when disassembling the unit without allowing it to be released into the atmosphere. The total amount of SF₆ recovered in fiscal 2017 was approximately 340 kg, which is the equivalent of approximately 7,700 metric tons of CO₂.



NGK Insulators Tangshan Co., Ltd.

NGK Insulators Tangshan has introduced measures conducted at Japanese sites to reduce CO₂ emissions. Our efforts started with encouraging the daily practice of switching off lighting and other equipment when not in use, with the primary intention of raising employee awareness. We are continually working to improve activities with the help of the Komaki Site, which sends personnel to Tangshan every six months to perform an on-site inspection and suggest improvement plans.



NGK Ceramics Polska Sp. z o.o.

Since 2011, NGK Ceramics Polska has been focusing on improving processes for manufacturing SiC-based DPFs, its main product. Target areas include particularly energy-intensive calcination and drying processes, for which we have carried out various measures to reduce our CO₂ emissions. To further improve our performance, we will introduce new measures, including technologies provided by the Nagoya Site.



NGK Metals Corporation

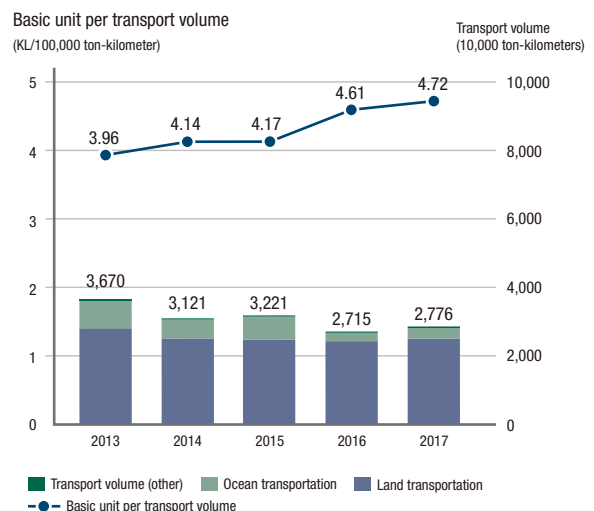
NGK Metals is reducing CO₂ emissions by updating control systems and improving the operation of production equipment. Among various efforts, a particularly distinctive effect resulted from automating the control units of the oil circulation system for rolling mills. The automation eliminated unnecessary around-the-clock operation, a measure taken to address inefficient activation/deactivation processes, as well as simplifying complex manual processing. This change helped reduce electric power consumption as well as CO₂ emissions.



Reduction of CO₂ from Logistics

NGK has worked to reduce CO₂ emissions from logistics, setting a target of reducing the basic unit per transport volume by 1% year-on-year on a five-year average, as required by the Energy Conservation Act. To achieve this target, we have implemented a number of measures, including improving loading efficiency and promoting a modal shift. In recent years, the basic unit per transport volume has shown a tendency to deteriorate due to a decline in the volume of goods transported by sea on account of a change in the product mix. In fiscal 2017, the five-year average deteriorated by 4.5% year-on-year.

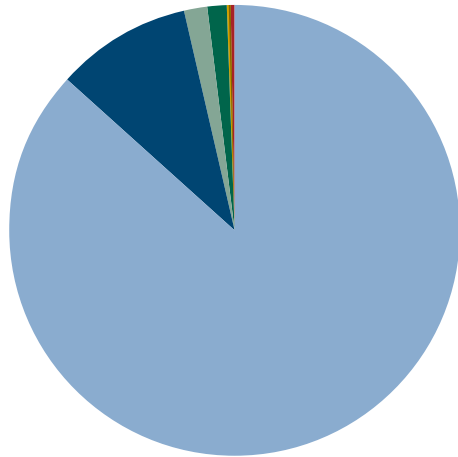
Transport volume / basic unit per transport volume



Reporting Scope 3 CO₂ Emissions

The NGK Group reports Scope 1 and 2 CO₂ emission data for the Group overall and for NGK independently in relation to logistics (for shipment from NGK). In addition to this, in recent years NGK has begun to prepare Scope 3 data on a non-consolidated basis in response to emerging expectations for businesses to expand the relevant data reporting scope to include supply chain CO₂ emissions levels.

In fiscal 2017, NGK established calculation methods for all categories involving only NGK logistics (upstream from NGK) and obtained a total. As a result, NGK confirmed that the total volume of CO₂ emission from NGK logistics was 877,000 metric tons, which was over six times more than the 138,000 metric tons of NGK in-house CO₂ emissions (sum of Scope 1 and 2), and that Category 1 (purchased goods and services) amounted to nearly 90% of total CO₂ emissions. NGK will continue to develop calculation methods that can ascertain CO₂ emission levels in relation to a greater range of items.



FY2017 Scope 3 Data
(NGK non-consolidated, upstream only)

Category	CO ₂ emissions (10,000 metric tons)
Category 1: Purchased goods and services*	76.2
Category 2: Capital goods	8.4
Category 3: Fuel- and energy-related activities	1.6
Category 4: Upstream transportation and distribution	1.1
Category 5: Waste generated in operations	0.1
Category 6: Business travel	0.1
Category 7: Employee commuting	0.2
Category 8: Upstream leased assets	0.0
Total	87.7

*Resale items are included in Category 1.

Please note that the calculation used for Scope 3 data was carried out in accordance with Basic Guidelines Regarding the Calculation of Greenhouse Gas Emissions through the Supply Chain (Ver. 2.2) (Ministry of the Environment; Ministry of Economy, Trade and Industry).

Introduction of Green Power

As part of our corporate activities aimed at harmony with the environment, NGK began introducing “green power” (energy sources such as wind and solar power and biomass fuels) in 2002, earlier than any other company. The Green Power Certification System contract we signed with Japan Natural Energy Company Limited calls for them to generate two million kilowatt hours of biomass-generated electricity for us each year.

This accounts for about 60% of the power consumed annually at the NGK headquarters building, attaining a reduction effect of approximately 1,000 metric tons of CO₂ emissions per year (based on fiscal 2017 results; CO₂ conversion factor: 0.532), or the annual amount of CO₂ absorbed by approximately 71,000 cedar trees.



Promoting Effective Use of Resources

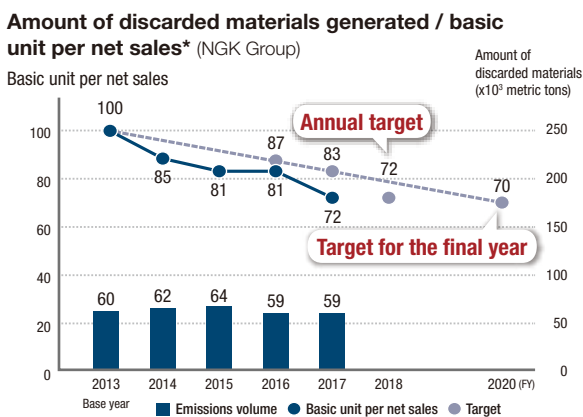
To boost yield from manufacturing process improvements, the NGK Group reuses in-process materials in an effort to curb discarded materials while also focusing efforts on recycling to reduce final disposal volumes to promote resource recycling.

Reducing Discarded Materials from Manufacturing Activities

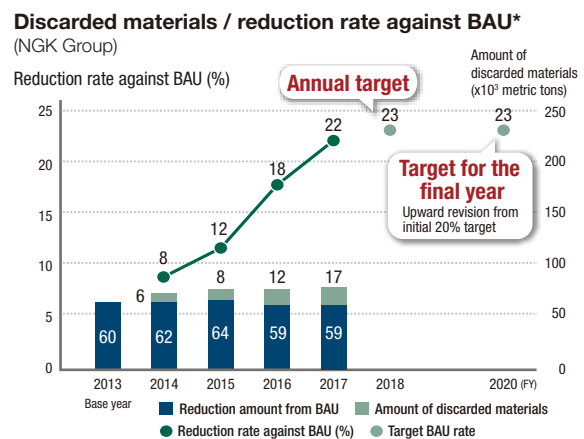
In the same way as for CO₂, the NGK Group works to suppress the generation of waste (discarded materials) by formulating and managing annual improvement plans with the aim of achieving the waste reduction targets contained in the Five-Year Plan.

Although in fiscal 2017 we once again faced the challenge of negative factors associated with the building of new factories overseas, in the same way as for CO₂, the basic unit per net sales showed a great improvement over the previous year, exceeding the annual target. This was thanks to the outstanding efforts of our manufacturing divisions that were directed at improving the material utilization rate, production yield, and recycling within each process, enabling them to achieve a drastic improvement in the basic unit per production volume over the previous year for many of our mainstay products. The reduction rate against BAU, which indicates the rate of improvement in the basic unit per production volume from the fiscal 2013 level, reached 22%, achieving the Five-Year Plan target ahead of schedule. We have therefore revised target values upward, aiming for a further improvement.

In fiscal 2018, we will continue with these improvement activities, as we work towards achieving the remaining targets contained in our Five-Year Plan.



*Basic unit per net sales calculated with the value in fiscal 2013 set at 100.



*Reduction rate against BAU: The percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions.

Promoting Resource Recycling

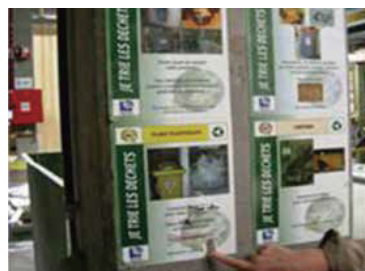
At the NGK Group, we promote resource recycling initiatives, pursuing rigorous sorting and separating practices and seeking out new methods of recycling.

In fiscal 2017, we started sharing information with our production sites in Japan regarding waste recycling methods and companies that can process such waste. This initiative led to a thorough review of waste processing for the Group as a whole within Japan, resulting in improved recycling efficiency. Through such ongoing efforts, we have managed to sustain a domestic recycling rate of 99% or higher since fiscal 2013, which is the target set under the Five-Year Plan.

Meanwhile, at our Group companies overseas, where the situation varies according to country and region, suitable targets are set taking into account circumstances specific to each location. The recycling rate for our 16 manufacturing Group companies overseas has remained at around 90%, based on calculations that exclude three companies that generate non-recyclable waste.

Overseas Group Company Implementation Examples

At overseas Group companies, waste material separation management is strictly enforced. Waste separation rules are posted where waste materials are stocked and color-coordinated containers are provided for each category of waste to avoid confusion.



NGK Ceramics Europe



NGK Ceramics USA

Risk Management of Water Resources and Response

The NGK Group recognizes the management of water resources as an important issue for the company in achieving a sustainable society, and promotes relevant initiatives as described below.

Water Risk Evaluation

At the NGK Group, to ascertain water supply risks for each of our production facilities within Japan and overseas, we perform a simplified internal survey to assess water shortage risks based on the water supply capacity of rivers in the respective regions. For production facilities located in areas where there is a risk of water shortages, we commission a third party to conduct a comprehensive survey. As part of that survey, in addition to the water supply capacity of rivers, factors such as groundwater, seasonal fluctuations in water supply capacity, and the holding capacity of dams are evaluated and used to create water supply/demand forecasts. The risk of water-related disasters (flooding, landslides) and water quality deterioration (public health, ecosystem) is also analyzed as part of a comprehensive risk assessment.

Although no serious water-related risks have been identified to date at any of our facilities, we will continue to monitor the situation and stay abreast of regulatory trends to ensure stable operations in the future.

In the future, we will conduct detailed analyses at all overseas bases so that we can identify water risks.

Water Usage Guidelines

NGK created guidelines (an implementation status checklist) aimed at appropriate water usage and, in fiscal 2015, launched inspections to ascertain the efficiency of water usage at all manufacturing sites in and outside of Japan. Going forward, we will enhance these guidelines through internal and external case studies while encouraging efforts at each location to strengthen the operational structure against a future tight water supply.

Promoting Efficient Water Use at Group Companies

NGK Ceramics Mexico, S. de R.L. de C.V.

We strive to use precious water resources as appropriately and efficiently as possible, including the recycling of water used inside plants, at Group companies located in highly water-stressed regions.

For example, at NGK Ceramics Mexico, manufacturing process waste water is filtered using reverse osmosis membranes and the recycled water is reused as coolant and boiler water or sprinkled on vegetation.



Filtration device using reverse osmosis membranes

Cooperation with Suppliers

Believing that it is important to address issues related to water resources throughout the supply chain, the NGK Group asks its suppliers to practice water resource-related risk management and efficient water usage in accordance with the CSR Procurement Guidelines. In fiscal 2017, a total of 750 companies, accounting for 99.9% of NGK's domestic supply chain, agreed to our request.

Protecting Biodiversity

In the NGK Group, we view the challenge of protecting biodiversity as an integral part of achieving a sustainable society, and towards that end we are undertaking the following activities.

Activities for Achieving the Aichi Targets

The NGK Group has been pushing forward with activities pursuant to the Aichi Targets (international goals for biodiversity) agreed upon at the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10).

In fiscal 2017, we did another biodiversity survey of a company-owned site and began promoting participation in the “My Action Declaration” initiative.

NGK activities commenced in fiscal 2016 are in red.

Aichi Targets		NGK Activities
Target 1 Spread awareness	People are aware of the value of biodiversity and actions to be taken to conserve it.	Employee environmental education, next-generation education, cooperation with suppliers, promoting participation in My Action Declaration initiative , encouraging employees to participate in volunteer activities
Target 4 Sustainable production and consumption	Stakeholders at all levels have taken steps to achieve sustainable production and consumption.	Expanding sales of products contributing to environmental protection, CO ₂ reduction, effective use of resources, cooperation with suppliers
Target 5 Inhibit loss of all natural habitats	The rate of loss of all natural habitats, including forests, is at least halved, and degradation and fragmentation is significantly reduced.	Voluntary employee participation in forestation and other environmental conservation activities, biodiversity survey/appropriate control of company-owned site
Target 8 Control pollution by chemical substances, etc.	Pollution from use of chemicals, including fertilizers and agrichemicals, has been brought to levels that are not detrimental to the ecosystem.	Chemical substance management, management of exhaust and wastewater, expanding sales of products that prevent air pollution, cooperation with suppliers
Target 9 Alien species	Invasive alien species are controlled or eradicated.	Biodiversity survey/appropriate control of company-owned site
Target 11 Conserve protected areas	At least 17% of terrestrial and inland water areas and 10% of coastal and marine areas are placed under appropriate conservation management.	Voluntary employee participation in forestation and other environmental conservation activities
Target 14 Ecosystem services	Ecosystems that provide essential natural services are restored and safeguarded.	Voluntary employee participation in forestation and other environmental conservation activities, biodiversity survey/appropriate control of company-owned site

Promoting Participation in the “My Action Declaration” Initiative

In fiscal 2017, as a way of raising awareness among employees, we began promoting participation in the “My Action Declaration” initiative led by the Japan Business Federation and the Ministry of the Environment. This project aims to have by 2020 a million people make a declaration to take action to conserve biodiversity.

Declarations were received from around 4,300 employees (97% of all NGK employees) who promised to take a personal interest in and work to protect the biodiversity around them. We are continuing to promote this initiative and working to ensure its horizontal expansion throughout NGK Group companies in Japan.



My Action Declaration card

Cooperation with Suppliers

We have added to the CSR Procurement Guidelines items pertaining to water resource-related initiatives and biodiversity conservation initiatives. We have won the almost full agreement of our suppliers in Japan to comply with the expanded Guidelines.

Biodiversity Survey of Company-Owned Site

Continuing on from the winter survey that we carried out in fiscal 2016, we carried out a summer survey in fiscal 2017 and confirmed the existence of 20 species of birds, 141 species of plants, and 98 species of insects, which are the same levels as detected in the previous survey. Among these species, no alien species that required urgent action was found, meaning that biodiversity was being adequately maintained. We are planning to conduct surveys every two to three years from now on. The results of previous surveys are collated and displayed at a welfare facility on the survey site for the perusal of the general public and to help raise awareness regarding biodiversity.



Biodiversity survey

Environmental Education and Communication

In accordance with the Guidelines for Environmental Action under NGK's Core Policy on the Environment, we conduct ongoing environmental education and awareness activities aimed at increasing employee environmental awareness. Our aim is to deepen the understanding of environmental problems among each employee to inculcate an awareness of environmental conservation activities.

We also conduct environmental events and provide information to a wide range of stakeholders, including on-site classes at elementary schools, to increase environmental awareness.

Participating in Local Environmental Education

Offering Guest Lectures at Elementary Schools and Children's Centers

NGK sends instructors to participate in lectures and workshops for young people that are hosted each year by EPOC (Environmental Partnership Organizing Club)*. In fiscal 2017, the program was held at Einan Children's Center in Yatomi, Aichi Prefecture, where our instructors offered a class on water resources and usage, in which children could experience how soil can purify water.

So far, a cumulative total of 2,200 people have participated in environmental education programs with which NGK is affiliated.



Employee Volunteers Teaching Parent-Child Insect Classes

Every summer at Tsuruma Park in Nagoya's Showa Ward, NGK employees and Executive Vice President Kanie teach Summer Break Insect Observation classes for children and their parents (hosted by the Nagoya City Greenery Association), explaining the various names and ecosystems of insects living in the park.

This annual event has been attended by a cumulative total of 600 people since 2007.



Sharing Information with Other Companies

The EPOC* subcommittee chaired by NGK organizes seminars and field trips several times a year under the theme of corporate environmental management (low carbon, resource recycling, biodiversity, water resources, environment-related laws, etc.) and sends out information to members.

*EPOC (Environmental Partnership Organizing Club): A voluntary organization consisting mainly of companies in the Chubu region of Japan, which was established in 2000. Its purpose is to spread information regarding the environment with the aim of building a recycling-oriented sustainable society. NGK has been involved in the planning and management of this organization since its establishment. EPOC currently has approximately 270 members.



Raising Environmental Awareness

Environmental Education inside the Company

We conduct position-based training related to environmental management systems to familiarize employees with the aims and content of NGK's environmental policies. We also provide specialized environmental training courses for personnel who will be directly involved in environmental management, as well as special environmental training for the entire workforce.

For our special environmental training in fiscal 2017, we invited Mr. Itaru Yasui, former vice president of the United Nations University, to teach us the significance of the Paris Agreement and the UN's Sustainable Development Goals (SDGs) and how this relates to companies.

Promoting the Acquisition of Qualifications

To continue conducting environmental conservation activities in compliance with laws and regulations, we make an effort to develop and increase the skills of legally qualified personnel. We provide support in each department for the acquisition of environment-related legal qualifications targeting managers engaged in pollution prevention required for the management of each site.

We systematically educate Qualified Energy Managers in the Engineering Department, and Special Controlled Industrial Waste Managers and others involved in waste-related activities in the Environmental Management Department and other business divisions.

Qualifications Acquired as of March 31, 2018 (NGK)

Pollution Control Managers			Qualified Energy Managers	Special Controlled Industrial Waste Managers	Waste Disposal Facility Technical Managers
Air	Water	Noise/Vibration			
75	93	27	22	16	4

Support for Acquisition of Eco Test Certification

With the aim of ensuring that each employee acquires a strong environmental awareness and a wide range of knowledge with respect to the environment, NGK encourages employees sitting the Eco Test* by lending them reference materials and subsidizing test-related expenses.

To date, a total of 719 people—more than 18% of all NGK employees—have passed the test. In fiscal 2017 alone, 125 employees passed the test.

*The Eco Test is an environmental and social certification test administered by the Tokyo Chamber of Commerce and Industry focused on a wide-range of environmental issues.

NGK Eco Point System

NGK promotes its Eco Point System in an effort to contribute to regional environmental improvement. Employees earn points for environmental behavior conducted at work and in the home, a portion of which is converted into cash and donated to local government-managed funds (environmental funds).

In addition to the company's three sites in Nagoya, Komaki and Chita and the Ishikawa Plant, the system was newly introduced to the Tokyo Main Office and Osaka Branch and sales offices in fiscal 2016.

Donation of NGK Eco Points

The NGK Eco Points earned by individual employees through their engagement in environmental activities are aggregated on an annual basis for each site (Nagoya, Chita, Komaki, Ishikawa), and top scorers are commended every year. For earned points, employees select from two options: exchange for eco goods or donate to local funds. The number of employees choosing donation is growing every year, indicating increasing environmental awareness.

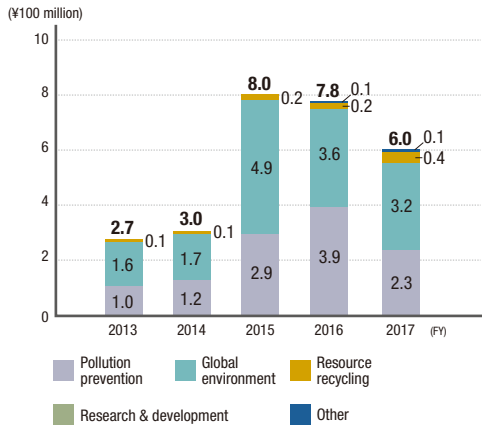


Mr. Kazunari Nakaguchi (right), Environmental Management Supervisor at our Chita Site (Metal Product Dept.) presenting Eco Points to Handa City Mayor Sumio Sakakibara, on behalf of all NGK Eco Points participants in the Chita area.

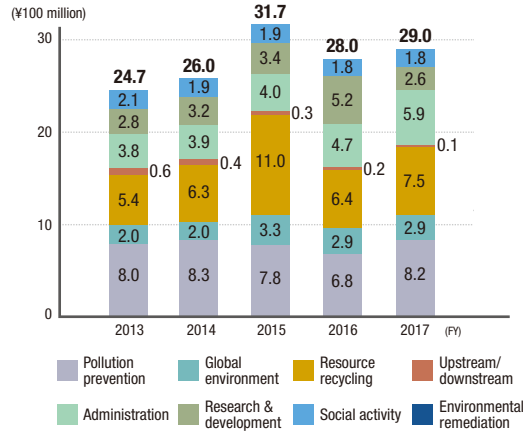
Environmental Accounting

As an important index of environmental management, NGK conducts environmental accounting and announces the results. In addition to announcing environmental conservation costs (capital investment, expenses), economic benefits, and cost effectiveness, information on the environmental efficiency of CO₂ and discarded materials has been added since fiscal 2007.

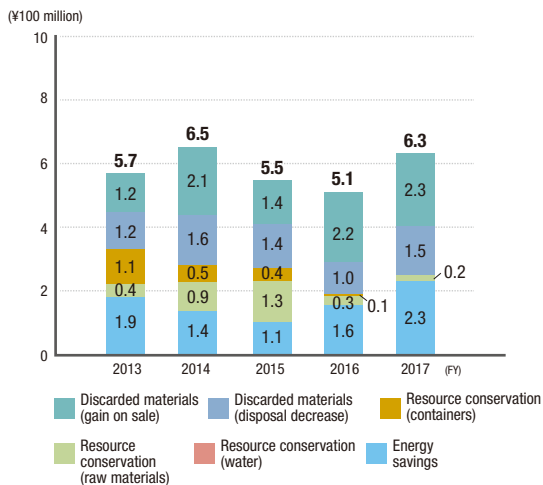
Capital investment (NGK and domestic Group companies)



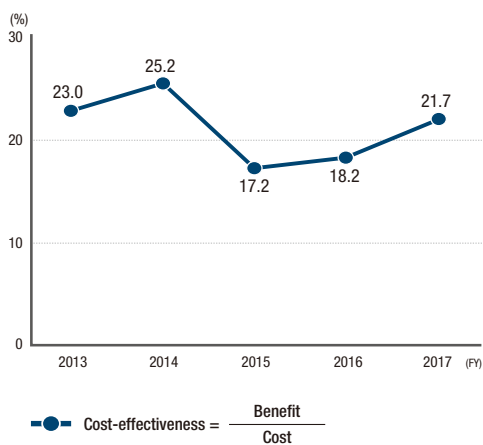
Expenditures (NGK and domestic Group companies)



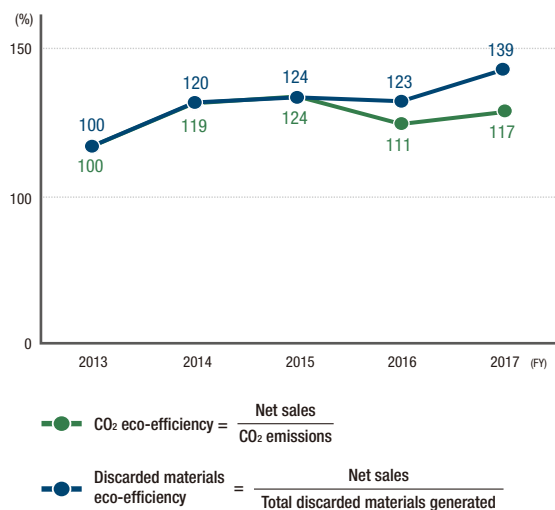
Economic benefits (NGK and domestic Group companies)



Cost-effectiveness (NGK and domestic Group companies)



Environmental efficiency (consolidated)



Note: The above charts do not include data for NGK Electronics Devices, Inc. and other manufacturing subsidiaries from fiscal 2013 to fiscal 2015.

Customers

Guided by the Corporate Philosophy, which puts customers first, the NGK Group considers the provision of products and services that contribute to a better social environment to be one of its most important missions in an effort to create quality from the customer's perspective.

Basic Approach

The NGK Group engages in the creation of quality from the customer's perspective by defining Quality Objectives each year in accordance with the Quality Policy based on the NGK Group Guidelines for Corporate Behavior.

Initiatives for Fiscal 2018

In fiscal 2017, we created an operations protocol (QRE-P*) which enables us to more effectively eliminate quality-related risks in all processes from product planning to mass production. Deployment in-house has been carried out using actual development projects, and through this we have begun improving developer awareness and knowledge.

At the same time, however, we have undertaken company-wide self-checks of all products within the NGK Group in order to ascertain whether we are fulfilling quality-related contractual provisions agreed upon with customers. These self-checks brought to light a non-conformity in delivery tests for insulators and other products sold by the Power Business Group, and we have taken steps to rectify this situation.

For fiscal 2018, we are supplementing our existing quality risk elimination activities with initiatives aimed at reviewing each department's quality assurance roles and overhauling their structure in order to strengthen quality compliance.

Quality Policy
 NGK is dedicated to quality and committed to providing valuable products and services that are trusted by our customers and respected by society.

Fiscal 2018 Quality Objective
 Overhaul and thoroughly reinforce quality assurance structures.

*QRE-P: Quality Risk Elimination Process

Quality Activity System

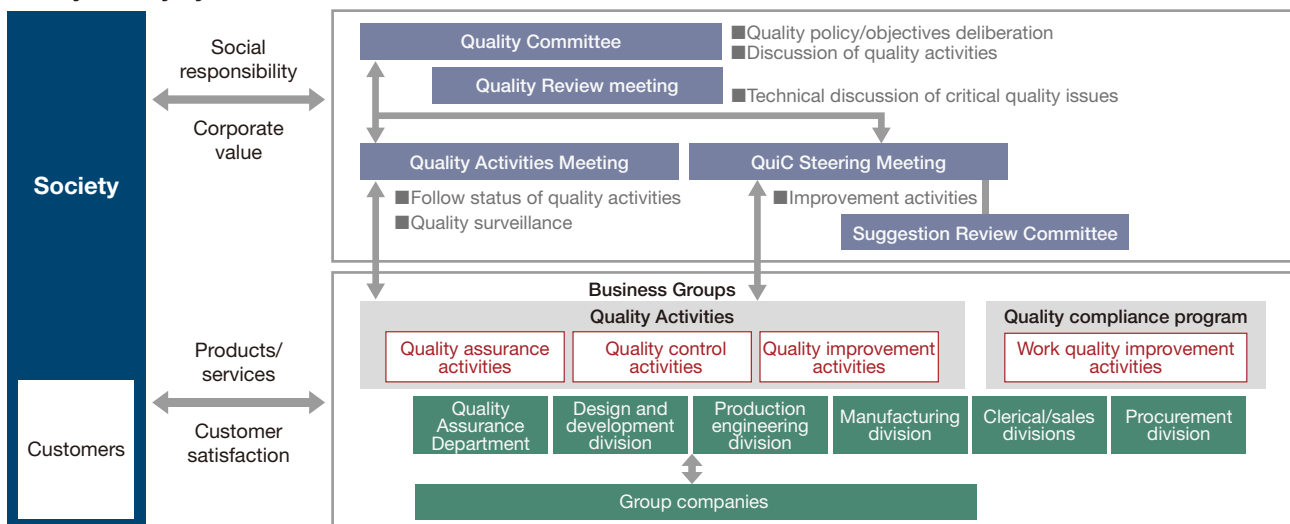
The NGK quality activity system consists of a company-wide system, led by the Quality Committee Chair, and business division internal activity systems, led by the heads of each business division. In terms of company-wide activities, the Quality Committee was established to function as a deliberative body assisting the Quality Committee Chair, while business division internal activity systems were put in place for each business line, creating appropriate quality systems for each. Quality assurance, quality control, quality improvements, and quality education activities are promoted by the acquisition of ISO 9001 or IATF 16949 certification.

In the event of a serious quality-related issue, the CSR Committee Chair and the Quality Committee Chair will discuss and cooperate in making a response. Technical issues are discussed at Quality Review meetings, as necessary, to plan countermeasures, and the Quality Committee Chair supervises execution of the measures at the responsible division. In the case of an external issue, the CSR Committee Chair will direct necessary arrangements to take an appropriate response without delay.

Starting in fiscal 2018, we have sought to address non-conformity issues in the delivery tests by codifying standardized rules that will further strengthen our quality compliance. In addition we have expanded quality-focused activities for "work quality" as well as "product quality".

In terms of organizational structure, we have made revisions to the members of the Quality Committee to ensure that quality activities are directly overseen by senior management, and, with regard to the Power Business Group and its compliance issue, we have assigned customer quality assurance duties to a quality assurance department, which is independent of the Business Group carrying out the business activities.

Quality Activity System



Enhancing the Elimination of Quality Risks Company-Wide

NGK Group Quality Activity Rules

The NGK Group promotes restructuring of its quality activities to respond more precisely to increasing and diversifying quality demands from customers in different target markets. In particular, quality activity rules have been formulated to eliminate quality risks in the market; we are promoting the establishment and improved efficacy of the rules.

Seeking Greater Effectiveness from Quality Activities and Innovation in Operational Procedures

In fiscal 2017, we began implementation of the Quality Risk Elimination Process (QRE-P), through which we can identify procedural innovations in product realization in order to eliminate risk while improving quality. QRE-P is a tool, created by the Quality Management Department based on insights gained from past quality activities, which provides specific risk awareness procedures to be followed instead of having to rely on the personal experience and skill level of individual employees. QRE-P has now been implemented for four existing products and four new products.

In fiscal 2018, departmental rules will be revised to incorporate those products for which QRE-P is being applied, while application of QRE-P to other products is also scheduled.

Four Rules for Quality Activities

○ Quality confirmation rule

Establish milestones, from development to start of production, and confirm conformance with six quality levels when production processes change.

○ DR function strengthening rule

Register DR plans with quality risks of medium or high level as important DR subjects with participation of DR reviewers. The Quality Management Department head holds company-wide DRs for cases with particularly high risk level.

○ Quality monitoring rule

Monitor and share information company-wide with respect to quality status changes or problems concerning products or markets. Manufacturing defects and customer complaints are shared company-wide every month through reports to the Quality Management Department, and the appropriateness of countermeasures is discussed.

○ Handling major customer complaints rule

In the event of a serious customer complaint, including a potential complaint, the situation is promptly reported to the Quality Committee Chair to formulate company-wide countermeasures.

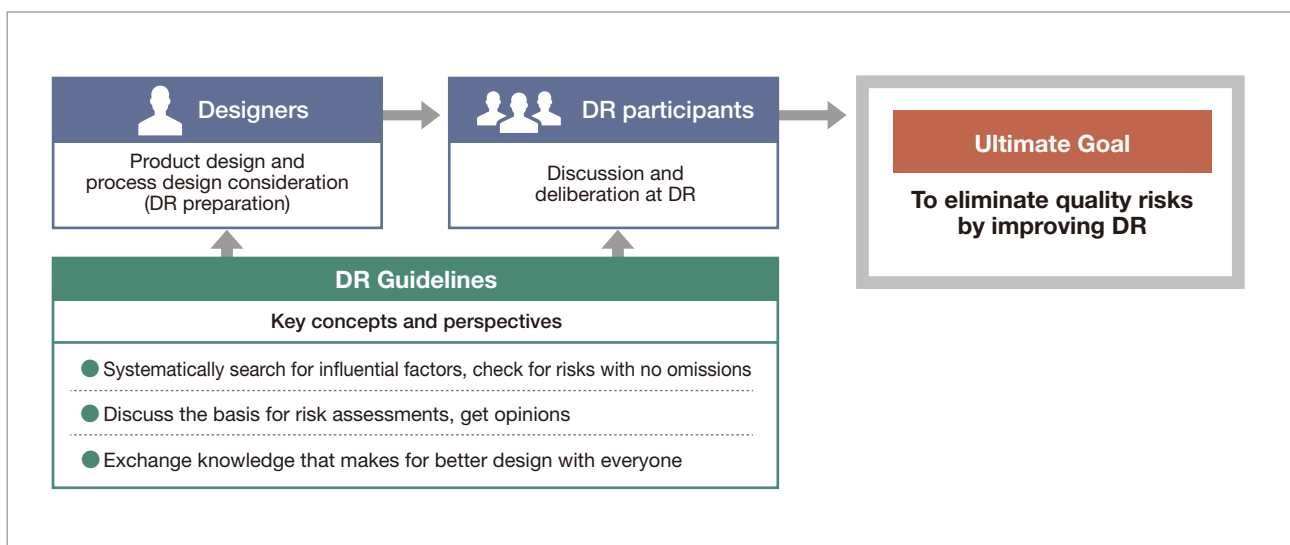
Activities to Enhance DR Functions

The increasing and diversifying quality demands from customers call for the integration of knowledge among various members, not only from the design division but also from the manufacturing and production engineering divisions, throughout the development process. For this reason, the Group considers the Design Review (DR) to be the most critical activity. DRs are conducted when development milestones are reached or when production processes change. Critical DRs are conducted by reviewers from throughout the company to support the elimination of risks.

The DR Guidelines were created to promote DR discussions and to eliminate quality risks thoroughly. We are constantly enhancing the effectiveness of DRs through efforts to spread these guidelines, including education and reviews of each DR. In addition, we have prepared and are utilizing the DR evaluation indicators to encourage improvements by visualizing the progress of each division's level.

Furthermore, NGK organizes a company-wide DR (quality review meeting) for quality issues that are difficult to solve by one division. At this meeting, relevant engineers and experts from across the company discuss broad aspects of issues related to the reliability and safety of products.

We are also deploying the above-mentioned QRE-P approach to facilitate improvement at the pre-DR design level as well as to ensure more effective utilization of the organizational knowledge and experience from DRs.



Quality Activities at Overseas Production Bases

From their inception, overseas production bases have created quality systems appropriate to their situations and acquired ISO 9001 or IATF 16949 certification.

Monthly reports from each base regarding customer complaints and the status of manufacturing quality are discussed at quality activity meetings, enabling the entire NGK Group to evaluate the quality status in a timely manner. Moreover, quality activity rules and annual quality objectives are developed in an attempt to develop and enhance quality activities.

NGK Group Quality Activity Meeting Held at Overseas Plants

In fiscal 2017, the meeting was held at seven plants overseas. Discussions were held on the important subject of each plant to improve quality. Information was also provided on the situation of the NGK Group's quality activities.

Companies Visited

- NGK Metals (NMC)
- NGK-Locke Polymer Insulators (NLPI)
- NGK Ceramics USA (ACU)
- NGK Ceramics Mexico (ACM)
- NGK Energys Myanmar (NEM)
- FM Industries (FMI)
- NGK Ceramics Suzhou (ACC)



Quality activity meeting held at NGK-Locke Polymer Insulators

TOPIC

Quality Improvement Activities at Overseas Production Plants

During quality activity meetings held at overseas production plants, attendees are introduced to the NGK founder's philosophy as well as to predecessors' thoughts regarding quality. These meetings improve members' understanding of the NGK Group and help enhance motivation.

1. What is quality for NGK?



NGK Nagoya factory in 1929

After that, NGK pursued the uniformity of production. Therefore, we could realize the top quality insulators which the competitors could not follow.

This quality creates the base of our actual business.

Founder's Word
 "Even if the defect product is only one among 1,000 pieces for the company, the defect ratio is 100% for the user who bought it."

会社の立場から見れば千個つくって1個不良品がでたとしても、そのパーセンテージは0.1%にすぎないが、その1個の不良品を買ったユーザーの立場からすれば100%の不良品だ。



2nd president Magsamen Eizo

QuiC Activities to Improve Quality with Full Employee Participation

Since 2003, the NGK Group has held QuiC (Quality up innovation Challenge) quality improvement activities in which all employees participate. These activities consist of quality improvement activities by small groups and suggestions that strive to enhance the quality of products and work; the best practices are shared by the entire NGK Group. Every July, NGK holds a company-wide contest at its headquarters to highlight examples of outstanding improvement activities with the intent of horizontal expansion throughout the company.

The fiscal 2017 contest was held over two days, marking the first time that the manufacturing and non-manufacturing divisions' challenges were separated.

The non-manufacturing divisions' contest began with a keynote speech in the morning, followed in the afternoon by the introduction of seven non-manufacturing practices, including two Group companies in Japan. For the manufacturing divisions' contest, 13 practices were introduced, including three overseas plants and three Group companies in Japan. Around 600 NGK Group employees and executives attended the competition.

Fiscal 2017 suggestion activity participation rate	
Manufacturing divisions	98%
Non-manufacturing divisions	93%
Number of suggestions	Approx. 38,000



Among non-manufacturing practices, the President's Special Award was presented to the Quality Management Department in recognition of autonomous activities it has undertaken



Among manufacturing practices, the Metal Manufacturing Department received its first-ever award for its analytical approach to eliminating customer issues, which was developed from a theory derived from ample data

Offering Award Recipients an Opportunity to Visit Overseas Sites

From the end of October to the beginning of November, four fiscal 2016 QuiC Outstanding Proposal Commendation recipients and two fiscal 2017 QuiC Grand Prize recipients visited NGK Ceramics Polska (Poland). At the company, the visitors and the local employees took training to be aware of risks for improvement and exchanged opinions.

This program is organized to provide participants with a firsthand opportunity to observe plants in other countries and talk with local and expatriate employees, thereby helping them better understand the importance of the mother factory as well as encouraging self-development. It is also expected to inspire workers at host companies to increase their quality awareness and motivation for engaging in improvement activities, thus accelerating the overall efforts of the Group.

In December, another six fiscal 2016 Outstanding Proposal Commendation recipients and eight fiscal 2017 Excellence Award and Special Award recipients visited Okinawa to attend a nationwide QC Circle Conference and participate in discussion sessions.



Training at NGK Ceramics Polska

Expanding Improvement Activities to Overseas Production Bases

The NGK Group is working to expand improvement activities to overseas production bases.

In October 2017, several NGK employees, as part of their overseas training, visited NGK Ceramics Polska (Poland), and they used this opportunity to introduce NGK's QuiC activities as well as to survey the activity level of improvement activities.

Strengthening Quality Education

Within the NGK Group, quality-related education and training is focused on equipping employees with knowledge and skills that are applicable to their actual jobs so that they can better address the specific needs of customers. Towards that end, we offer more practical programs where issues that are most relevant to participants addressed. And the programs began being deployed throughout NGK Group.

In addition, we are augmenting our Quality Management System (QMS) training with the aim of facilitating operational systemic improvements.

Main Practical Programs Strengthened in Fiscal 2017

Program name	Number of days and participants	Objective
Quality Basic II	70 days; 46 (all technical personnel in their third year since joining the company)	Learn and practice problem-solving using quality engineering methods
QC Training for Group Companies	NAC 7 days; 11 young factory employees	Use problem-solving procedures to facilitate issue awareness; practice and learn resolution methods
QMS/ISO Training	Basic: 1 day; 44 (4 from Group companies)	Learn the basic standards and requirements of quality control
	Applied: 3 days; 77 (27 from Group companies)	Enhance auditing effectiveness and certify in-house auditors
Preventive Action Training	Classroom lectures and issue examination and discussion: 6 days; 25 (3 from Group companies)	Understand basic approaches to preventive action and recurrence prevention; understand risk examination procedures Perform risk examination using actual issues faced by course participants
	Development project risk examination: 6 days; 8	Use actual development projects to perform risk identification and examination of response measures
Method of Creation and Learning from Failure	4 days; 35	Improve analysis and development skills to learn from failure and apply for the future

Strengthening Quality Management System (QMS) Training

1. Participation open to all personnel

In 2017, a basic course intended for beginners which introduces and explains QMS standards was developed and is being widely promoted throughout the NGK Group, including research and development departments, to foster a greater focus on quality starting from the design phase.

2. Enhancement of internal auditing capability

Training content has been improved by narrowing down the training objectives to produce a reliable increase in auditing capability.

In 2017, participants received training in risk auditing, focusing specifically on the 4Ms (manpower, materials, methods, machinery) that are involved in the process.

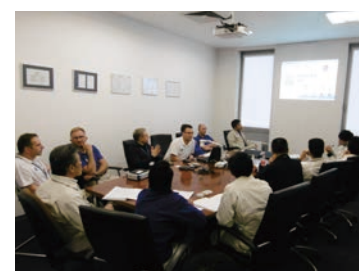
63 Employees Pass Self-Maintenance Expert Test (Grade 1: 31 Employees, Grade 2: 32 Employees)

Sixty-three manufacturing division and engineering center employees who are engaged in NGK's voluntary maintenance activities passed the Self-Maintenance Expert Test (Japan Institute of Plant Maintenance) conducted in October (Grade 1: 31 employees, Grade 2: 32 employees). This qualification is given to those who possess a broad range of knowledge and skills necessary concerning quality management, safety, and machinery maintenance, and are certified to have the ability of planning and implementing voluntary maintenance activities and giving instruction. NGK will continue to encourage employees to acquire such qualifications in order to improve quality management capabilities at manufacturing sites.

Strengthening Quality Education at Overseas Production Bases

We work to strengthen quality education at overseas production bases.

In fiscal 2017, NGK made use of the overseas training period to educate overseas members about NGK's stance and approach to loss, as well as to engage in dialogue with local improvement teams about the importance of applying the three "actuals" (visiting the actual location, inspecting the actual items, learning the actual situation) and adhering to the two "fundamentals" (fundamental rules and fundamental principles) of addressing chronic quality-related issues.



Employees

The NGK Group implements a human resource system which enables every employee to perform at their full potential under fair treatment.

Basic Approach

In the NGK Group Guidelines for Corporate Behavior, our relationship with employees is based on the idea of “ensuring respect for humanity and comfortable working environments” and defined as follows.

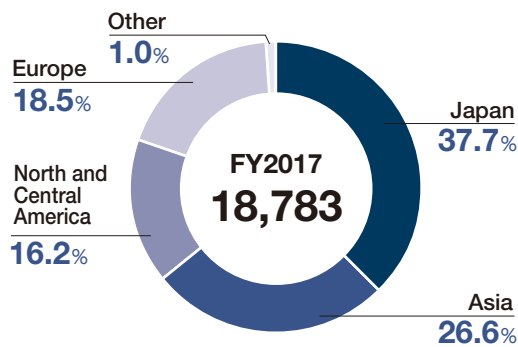
- We will hire and treat our people in a proper and fair manner and will provide a safe and pleasant working environment in which our people can work comfortably without sacrificing their family life.
- We will provide opportunities that allow a diverse range of personnel to take on new challenges, and will support the development of human resources through acquisition of knowledge and expertise.
- We will prevent any bullying, discrimination, harassment, or other acts that violate human rights and, if there is any violation, we will take appropriate actions in an expeditious manner.

Basic Information on Employees

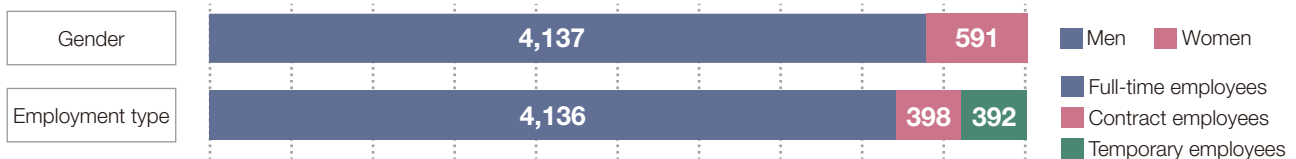
Number of NGK Group Employees

	Number of employees
FY2013	13,210
FY2014	16,217
FY2015	16,657
FY2016	17,517
FY2017	18,783

Composition of NGK Group Employee Composition by Region



NGK Employee Status in Fiscal 2017



Average age	38.7 years old (Men: 38.7 / Women: 38.6)
Average length of service	13.7 years (Men: 13.6 years / Women: 14.6 years)
Turnover ratio within 3 years among new hires	2.4%
Average salary	7,852,010 yen

Turnover Ratio	(No. of persons)		Voluntary Turnover Ratio	(No. of persons)		Number of New Hires Remaining at the Company (3 years)		
	FY2017			FY2017		New graduate hires in 2015	Retention in 2018	
Turnover ratio	0.82% (39)		Voluntary turnover ratio	0.76% (36)		Total	68	63
Men	0.68% (28)		Men	0.63% (26)		Men	58	55
Women	1.86% (11)		Women	1.69% (10)		Women	10	8

Revision of the Human Resource System for General Employees

In April 2017, NGK revised its human resource system for general employees to enable all employees, from the young to the experienced, to work with enjoyment and fulfillment. As NGK develops its businesses globally and promotes the creation of new products and businesses, it is essential to motivate young and mid-level employees who will take on future key roles and encourage them to demonstrate their full potential. The revised system aims to build the environment that makes these possible.

Key Points of the Revised System

Qualifications	<ul style="list-style-type: none"> • Developing a mechanism whereby all employees can challenge to qualify for a higher job grade. • Clarifying the definition of each qualification.
Evaluation	<ul style="list-style-type: none"> • Shifting from age-based evaluation to effort- and result based evaluation.
Retirement at age 65	<ul style="list-style-type: none"> • Maintaining the same level of salary after age 60.

Developing an Environment that Allows Employees to Demonstrate Their Full Potential

In the new human resource system revised in April 2017, we have clarified what kind of human resources the company is looking for and developed a system that allows young and mid-level employees to demonstrate their full potential. I hope they can actively take on challenges to move to higher stages. This system also allows mature workers to keep working in the same way until their retirement age of 65. I hope this revised human resource system can also increase motivation among women and encourage the NGK Group initiatives to promote women's active participation. We will keep on improving our human resource system by incorporating opinions from within our company.

Yuka Sugiura
Human Resources Department Manager

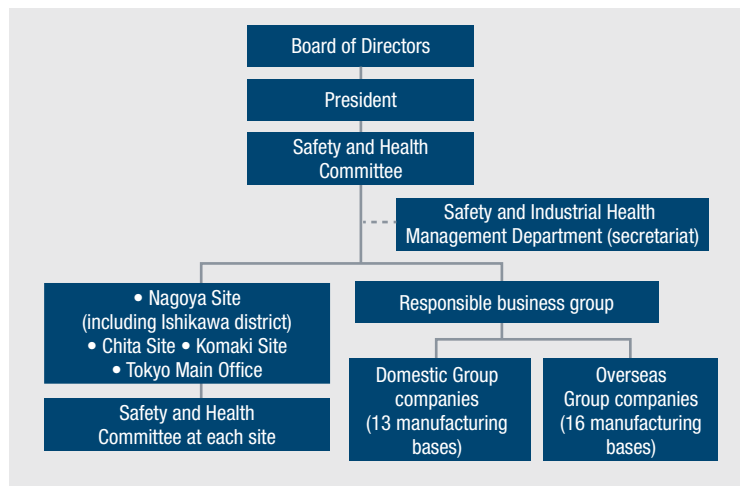


Safety and Health

Aiming for zero industrial accidents, NGK introduced an Occupational Safety and Health Management System (OSHMS) in fiscal 2007 as a mechanism for the ongoing systematic implementation of safety and health initiatives based on company-wide safety and health policies. Since then, we have made efforts to thoroughly embed and operate this system and strengthen risk assessment.

We also make a concerted effort to promote better health and wellbeing among our employees. In addition to our longstanding commitment to reduce overtime work and to monitor the health of employees who do work overtime, this year the NGK Group issued its Health Declaration, which is comprised of four main pillars: (1) Provide a workspace that is both people-friendly and work-friendly, (2) Cultivate a health-conscious corporate culture for executives, employees, and their families, (3) Promote early detection and early intervention for health concerns, and (4) Offer support for mental health and wellbeing.

Structure to Promote Safety and Health Management



Safety and Health Policy

Maintaining the safety and health of each employee constitutes the basis for a company's operation and existence

1. Comply with occupational safety and health laws and company regulations.
2. Engage in activities in line with the OSHMS* to continuously raise the safety and health standards.
3. Promote safety and health activities under enough education and training and good communication with employees.
4. Reduce the risks of hazards and toxicity and prevent accidents to provide a comfortable work environment.
5. Prevent employees' health hazards and enhance health promoting activities.

*OSHMS: Occupational Safety and Health Management System

Health Declaration

Health Declaration of the NGK Group

At NGK, we consider employee health and safety to be of fundamental importance to the company's operation and are, therefore, proactive about developing dynamic, people-friendly work environments and a health-conscious corporate culture, which contribute to better health for each and every employee.

Activities to Promote Safety and Health Management in Fiscal 2017

	Main points	Priority activities
NGK (non-consolidated)	Enhancement of education, focusing on programs for managers	<ul style="list-style-type: none"> • Implementing legal seminars for managers • Implementing practical risk assessment seminars for manufacturing division managers
	Improvement of the self-management system	<ul style="list-style-type: none"> • Expanding risk assessment beyond regular work operations
	Development of ability to foresee risks	<ul style="list-style-type: none"> • Enhancing experience-based safety education
	Ongoing workplace improvement initiatives	<ul style="list-style-type: none"> • Analyzing and responding to stress check results • Promoting chemical substance risk assessment
Domestic and overseas Group companies	Strengthening of the mechanism to identify and disseminate risks	<ul style="list-style-type: none"> • Promoting risk assessment activities • Enhancing the risk management system and the education system • Acquiring international standards certification (newly acquired by five companies)

Activities to Promote Safety and Health Management in Fiscal 2018

	Main points	Priority activities
NGK (non-consolidated)	Improvement of manager's risk management skills	<ul style="list-style-type: none"> • Expanding practical risk assessment seminars to technical workplaces • Improving the level of hazard source identification activities at each production site
	Improvement of the self-management system	<ul style="list-style-type: none"> • Reviewing work instruction and risk assessment activities • Actively developing "Near miss" activities and incorporating them into risk assessment
	Improvement of hazard awareness and strengthening of hazard prediction ability	<ul style="list-style-type: none"> • Launching hazard simulation/hazard prediction training school run by in-house instructors
	Promotion of health hazard prevention at priority workplaces	<ul style="list-style-type: none"> • Analyzing and responding to stress check results • Making improvements to mitigate potential for operations to negatively impact health
Domestic and overseas Group companies	Strengthening of compliance and augmentation of risk identification and awareness-raising systems	<ul style="list-style-type: none"> • Developing mechanisms to ensure legal compliance • Promoting risk assessment activities • Acquiring international standards certification (goal of new acquisition by seven companies)

Enhancing Safety and Health Activities

NGK views the enhancement of safety and health activities as one of its highest priorities.

Until fiscal 2015, the three sites of Nagoya, Chita, and Komaki led these activities, while Group companies promoted their own safety and health activities through their responsible business groups. Since fiscal 2016, the entire Group, including both domestic or overseas companies, has been working together on the enhancement of safety and health activities. As part of the efforts to enhance our global compliance and governance, we disseminate information to each site and keep track of individual situations. Through auditing and provision of support, we strive to solidly improve the level of our safety and health activities.

In September 2016, we developed a medium-term action plan with compliance, risk reduction, and enhancement of governance as the generic concepts. In order to further strengthen these efforts, we are also promoting the acquisition of international occupational safety and health management system certification at domestic and overseas Group companies.

Establishment of Hazard Simulation and Hazard Prediction Training School

For some time now, NGK has operated simple training centers at three sites in Nagoya, Chita and Komaki, as well as at the Ishikawa Plant, to allow newer employees and less experienced employees to learn about workplace hazards first-hand in order to help reduce the incidence of workplace accidents caused by new and inexperienced employees.

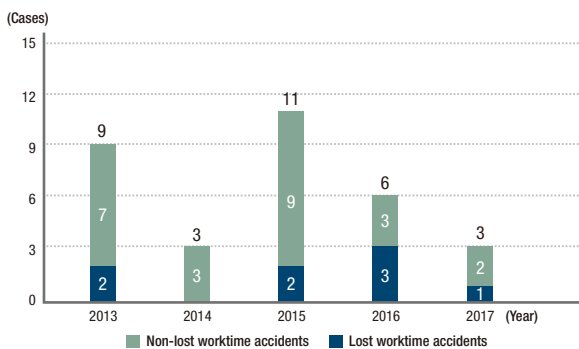
In June 2018, a new Hazard Simulation and Hazard Prediction Training School was established at the Chita Site, which not only provides general hazard simulation training but also specific hazard simulation training that utilizes replicas of actual equipment involved in in-house work accidents in order to be more directly applicable to employees' daily work.



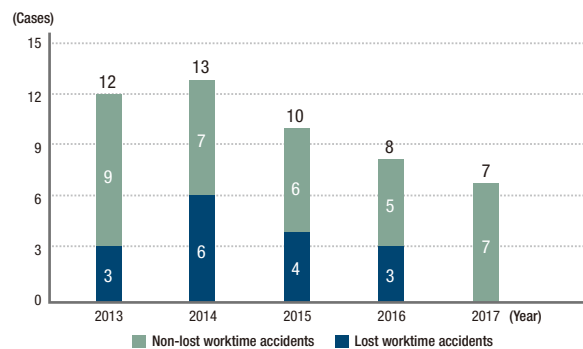
Training of Safety Assessors

We have been encouraging employees in the company facility design/maintenance divisions and manufacturing divisions to acquire Safety Assessor certification. This qualification is granted by the Japan Certification Corporation to recognize people who have a wide range of knowledge and skills in maintaining the safety of machines and equipment, in line with an official notice of the Ministry of Health, Labor and Welfare. There are four levels of certification in the system, awarded according to applicants' knowledge and skills. As of fiscal 2017, 73 employees have acquired Safety Sub-Assessor certification, and 317 employees Safety Basic Assessor certification.

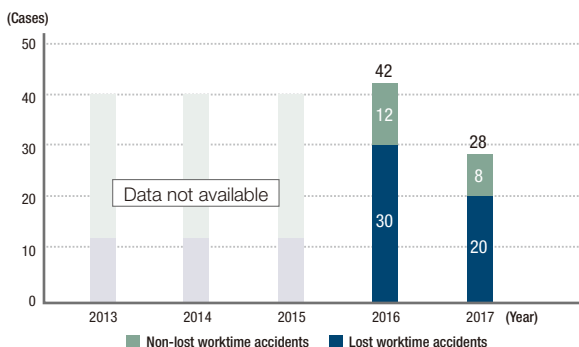
Work-Related Accidents (NGK)



Work-Related Accidents (domestic Group companies)



Work-Related Accidents (overseas Group companies)



Severity Rate

(the number of lost workdays per 1,000 hours worked)

	2013	2014	2015	2016	2017
NGK	0.015	0.000	0.007	0.004	0.000
Domestic Group companies	-	-	-	0.009	0.000
Overseas Group companies	-	-	-	0.040	0.022

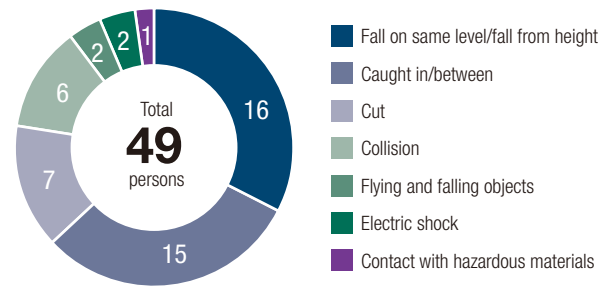
Rate of Lost-Worktime Injuries (NGK)
(the number of lost-worktime accidents per a million hours worked)

	2013	2014	2015	2016	2017
All industry total	1.58	1.66	1.61	1.63	1.66
Manufacturing industry total	0.94	1.06	1.06	1.15	1.02
NGK company-wide total	0.28	0.00	0.29	0.41	0.13
Domestic Group companies	-	-	-	0.50	0.00
Overseas Group companies	-	-	-	1.40	0.91

Rate of Occupational Disease (NGK)

	2013	2014	2015	2016	2017
	0.14	0	0	0.13	0

Work-Related Accidents by Type (past 7 years)

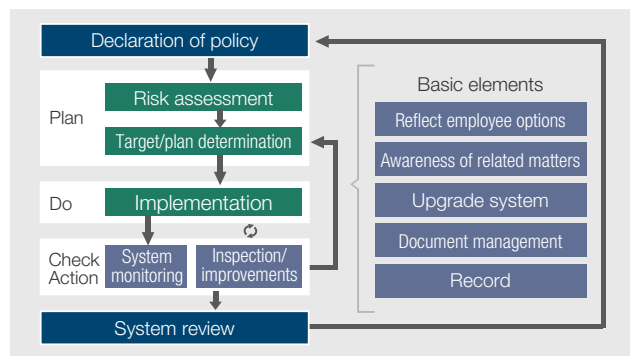


Number of Deaths from Work-Related Accidents (NGK and domestic Group companies)

	2013	2014	2015	2016	2017
(Person)	0	0	0	0	0

Enhanced Safety and Health Management

Aiming for zero accidents, NGK is promoting the enhancement of the Occupational Safety and Health Management System (OSHMS). At each site, department, factory, and workplace, we have independently established Safety and Health Committees which operate under the auspices of a Group-wide Safety and Health Committee to apply a PDCA cycle aimed at systematic and organizational improvement in occupational safety and health activities.



External Certification on Occupational Safety and Health Management System

The NGK Group promotes the acquisition of occupational safety and health management system certification, which is growing in importance globally, and to incorporate such systems into daily operations in order to supplement medium-term goals on safety and health.

In 2017 at NGK Insulator's Nagoya Site, in addition to the already acquired JISHA (Japan Industrial Safety and Health Association) system's OSHMS certification, the site acquired ISO 45001 for the first time in Japan. In 2018, our plan is to acquire integrated ISO 45001 certification which will cover our Chita and Komaki sites and the Ishikawa Plant, as well as all of our other business sites in Japan. Meanwhile, nine manufacturing-related Group companies in Japan and overseas have acquired OHSAS 18001 certification.

Acquisition of Management System Certification (as of March 31, 2018)

NGK	Nagoya Site: ISO 45001 certification and JISHA's OSHMS certification acquired Chita Site, Komaki Site, Ishikawa Plant: JISHA's OSHMS certification acquired
Domestic Group companies	NGK Adrec and Akechi Insulators: OHSAS18001 certification acquired
Overseas Group companies	ACC, ACIn, ACP, ACS, ACE, ACU, and NGK Insulators Tangshan: OHSAS 18001 certification acquired Note: ACC: NGK Ceramics Suzhou ACP: NGK Ceramics Polska ACE: NGK Ceramics Europe ACIn: NGK Ceramics Indonesia ACS: NGK Ceramics South Africa ACU: NGK Ceramics USA

Restricting Long Work Hours

Since July 2016, we lowered the maximum amount of overtime work to 70 hours per month. We also clarified work priorities at each division and revised the cross-sectional division of roles within a department.

As a result, the number of employees recording over 80 hours of overtime work a month in 2017 decreased 90% compared with the previous period, and only one employee exceeded the maximum amount of overtime in a month.

Overtime Work Hour Trends: General Employees

Hours worked (per person)	FY2013	FY2014	FY2015	FY2016	FY2017
Annual fixed working hours	1,919	1,919	1,919	1,919	1,919
Annual actual working hours	2,087	2,077	2,087	2,069	2,072
Average overtime work per month	24.4	24.5	24.9	23.7	24.3

Following Up on Employees Working Long Hours

NGK provides employees working long hours, including non-regular and part-time employees, with ongoing opportunities to meet with industrial physicians for health consultations and exams. The results are reported to and followed up on by Safety and Health Committees at each worksite. Also, the medical status of employees working long hours and the condition of those who need medical treatment are reported at monthly Safety and Health Committee meetings in an effort to thoroughly promote the reduction of overtime work.

Consultations by Employees Working Long Hours

Interviewees (persons)	FY2013	FY2014	FY2015	FY2016	FY2017
General employees	118	63	154	68	65
Managers	46	46	72	40	20

Note: Numbers of people shown are cumulative totals.

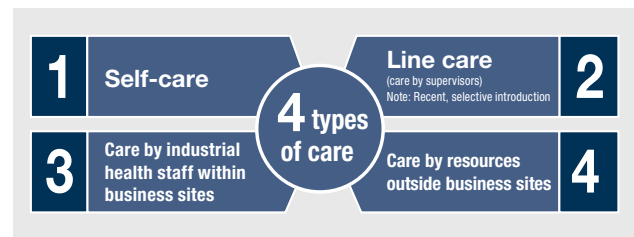
Promotion of Activities Supporting Mental and Physical Health

Four Types of Care for Mental Health

We facilitate the widespread implementation of ongoing mental and physical health promotion activities, centering on the four types of care for mental health promoted by the Ministry of Health, Labor and Welfare.

In fiscal 2017, we carried out stress checks for all employees. The results were subjected to group analysis, and environmental improvements are being advanced for those workplaces with a comparatively large number of highly stressed employees.

Four Types of Care



Position-Based Mental Care Education

We also conduct ongoing stratified mental care education. Continuing on from the previous fiscal year, in fiscal 2017 we selectively provided mental health education to managers in order to further enhance our recent key initiatives on line care (care by supervisors). We are also incorporating it into the job grade-specific education for new managers to deepen their understanding of mental health.

Position-Based Mental Care Education at NGK

	FY2013	FY2014	FY2015	FY2016	FY2017
New hires	88	56	199	234	158
General employees	293	291	272	325	181
Managers	95	95	87	450	63

Hosting a Safety Process Expert Meeting (PEM)

NGK's Ceramic Products Business Group invites overseas production site safety and health managers to its yearly Safety Process Expert Meeting (PEM) to review and discuss ways to improve safety levels across the NGK Group. In fiscal 2017, a total of 32 employees from HONEYCERAM production bases in Japan and overseas gathered to exchange safety-related information and ideas. Also, the Safety and Health Management Department discussed the practical risk assessment seminars (on-site hazard source identification and countermeasure creation-related training), which we have introduced for managers in Japan. All of the participants shared the good points and points for improvement that they discovered from actually visiting production sites and left with a great deal of heightened awareness as a result.

TOPIC

Company-Wide Forklift Safety Tournament

The Safety and Health Management Department held the first-ever Forklift Safety Tournament at the Komaki Site. The aim of this tournament is to serve as a complement to knowledge and skill acquisition done through classroom learning and competition, seeking to promote greater safety awareness for forklift operations by further invigorating forklift safety activities at individual work sites. This first company-wide tournament was also held with the hope that it would serve as a venue for idea and information exchange between work sites. On the day of the tournament, 14 employees selected from the Nagoya, Chita and Komaki sites, as well as the Ishikawa Plant, competed against one another in a demonstration of knowledge and technical skill.



Diversity

It is NGK Group's basic policy to recruit human resources and offer stable employment and equal opportunities regardless of race, nationality, creed, gender, or physical abilities. Also, in an aim to promote autonomy and independence, NGK maintains the human resource systems necessary to provide employees with fair compensation commensurate with their degree of contribution to the company.

NGK New Graduate Hires

Note: Excluding new graduates planned to transfer from temporary to regular positions. (Persons)

Joined company	University graduate			Junior college/vocational school graduate	High school graduate, other
	Total	Men	Women		
April 2014	36	28	8	0	20
April 2015	38	29	9	0	30
April 2016	94	67	27	0	60
April 2017	65	50	15	0	46
April 2018	104	72	32	0	51

NGK Mid-Career Hires

(Persons)

Joined company	Total	Total			
		University graduate men	University graduate women	Other men	Other women
April 2013–March 2014	7	3	1	3	0
April 2014–March 2015	49	15	4	30	0
April 2015–March 2016	200	69	12	116	3
April 2016–March 2017	158	66	15	73	4
April 2017–March 2018	135	58	12	63	2

System to Promote Diversity

At NGK, the Human Resources Department plays a central role in promoting diversity, including through nursing care support and promotion of women's active participation.

Regarding human rights issues, NGK strives to educate employees by distributing booklets on human rights on occasions such as training for the recently promoted employees. A helpline is also available for consultation on these issues.

Promoting the Success of Women

Appointment of Female Key Personnel (Management Staff)

The NGK Group strives to increase opportunities for motivated and skilled people to enhance their skills regardless of gender. We are also engaged in creating comfortable working environment for women. The number of female key personnel (management staff) of NGK in fiscal 2017 was 17.

Promoting Women's Active Participation through the Revised Human Resource System

NGK has revised its human resource system, aiming to enable employees in general employment positions who were engaged in routine tasks to take on a broader range and a higher level of work.

The new human resource system supports career advancement of individual employees. They can take the initiative to challenge to move up to a higher job grade.

Establishment of a Career Consultation Helpdesk

In March 2016, we established a career consultation helpdesk for female employees to discuss career-related concerns. At the helpdesk, certified career counselors provide support and consultation services to employees, while strictly observing confidentiality. Since May 2017, we have expanded the service to make it available not only to women but to all employees.

Introduction of System to Support Early Return from Parental Leave

We have introduced a system to encourage and support employees so that they can return from maternity and childcare leave and resume their careers at an early stage.

Certified as an “L-Boshi” Company for Excellence in Promoting Women’s Active Participation

In March 2017, NGK was certified as an “L-Boshi” company by the Minister of Health, Labor and Welfare (MHLW). This certification is granted to companies that have done excellent jobs in accordance with the Act on Promotion of Women’s Participation and Advancement in the Workplace.

Each applicant for the certification is evaluated on five criteria: recruitment, employment continuity, working hours, percentage of female managers, and diverse career paths. By meeting four of these five criteria, NGK has received the second highest certification of the three levels.



Certified as a Company Promoting Women’s Active Participation by Nagoya City*

In recognition of our efforts to create a workplace environment that encourages women’s active participation such as revising our system for transferring to career-track positions, we were certified as a Company Promoting Women’s Active Participation by Nagoya City in January 2012 and recertified in 2014.

*A system for certifying companies that conduct outstanding initiatives in the areas of (1) awareness improvement, (2) work-life balance, and (3) promotion of women’s active participation.



January 2012
Company Promoting Women’s Active Participation (Nagoya City)

Submitting Our Action Plan for Promoting Women’s Active Workplace Participation to MHLW

In January 2016, in accordance with the Act on Promotion of Women’s Participation and Advancement in the Workplace, NGK submitted a general employer action plan to the Aichi Labor Bureau, which is overseen by MHLW.

In this plan, NGK sets the goal of hiring more female employees. Accordingly, the proportion of women among new hires increased from 16% in fiscal 2012 to 29% in fiscal 2016. This figure was 23% in fiscal 2017.

We will keep working on the initiatives according to the action plan to accomplish our goals.

Action Plan

Issues

- Although there is no gender gap in terms of criteria for promotion and service years, the number of women in management positions and its candidates is small.
- The occupational range (job types, job locations, and titles) in which women play an active role is limited.

Goals

- Foster a corporate culture that promotes women’s active participation.
- Increase the number of candidates for managers (section chief level) by 1.5 times and prepare them for future appointment.

Initiative 1 Raise career awareness of female employees and utilize their inherent potential.

Initiative 2 Increase the ratio of women among new graduate hires and diversify career opportunities.

Ratio of Female Key Personnel (Managers)

	2014/3	2015/3	2016/3	2017/3	2018/3
Ratio of female employees ¹	13.3%	12.9%	12.6%	12.7%	12.5%
Ratio of female key personnel ²	1.5%	1.8%	1.8%	2.0%	2.0%
Ratio of female general employees ³	16.6%	16.1%	15.6%	15.5%	15.1%

¹: Ratio among all employees

²: Ratio among all key personnel

³: Ratio among all general employees

Ratio of Women in Managerial Positions at Overseas Group Companies (as of March 31, 2018)

	Europe	North and Central America	Asia	Other
Ratio of women in managerial positions	7%	17%	25%	29%

Female Key Personnel (Managers)

	2014/3	2015/3	2016/3	2017/3	2018/3
No. of persons	12	14	14	16	17
No. of department managers or higher	2	2	3	3	4

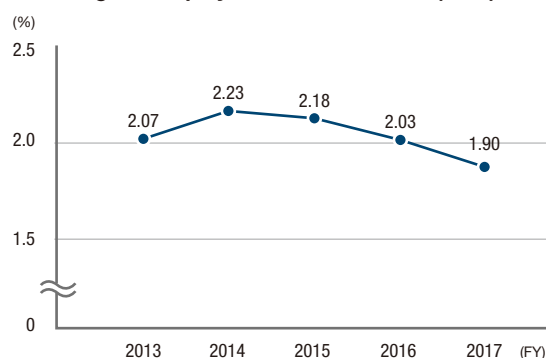
Expanding Employment of Persons with Disabilities

The NGK Group promotes employment of people with disabilities by accepting students from special-needs schools as trainees and hiring participants from employment seminars for people with disabilities. As a result, the percentage of employees with disabilities at the end of fiscal 2016 was 2.03%, which exceeded the legally mandated percentage of 2.0% for the fourth straight year; however, the percentage at the end of fiscal 2017 was 1.9%.

Continuing on from fiscal 2016, in fiscal 2017, we accepted students from special-needs schools as trainees, who we then hired as new employees in fiscal 2018.

We have also expanded the divisions that hire people with disabilities in order to broaden the scope of jobs available.

Percentage of Employees with Disabilities (NGK)



Various Systems to Make Use of Diverse Human Resources

The NGK Group implements systems promoting the utilization of human resources based on the idea that personnel diversity is linked to innovation in organizational culture.

Human Resource Utilization Systems Aligned with Employee Individuality and Skills

To open the way for employees to take full advantage of their individuality and skills, NGK adopts an internal job application system, in which open positions are announced internally and eligible applicants are appointed. There is also a career follow-up system for career track registration enabling applicants to register their work history, qualifications, and desired position to provide an opportunity for individuals to carry out their work duties with a sense of satisfaction. And an FA (free agent) system allows employees to register their personal aspirations and preference of jobs to appeal themselves within the company.

Internal Job Application System

	FY2013	FY2014	FY2015	FY2016	FY2017
Applications (cases)	2	19	28	17	32
Recruits (persons)	3	23	36	28	50
Applicants (persons)	3	12	23	11	15
Successful applications (persons)	1	8	9	4	5

Career Follow-Up System

	FY2013	FY2014	FY2015	FY2016	FY2017
Registered (persons)	5	2	2	0	3
Transferred (persons)	0	1	0	0	1

FA System

	FY2015	FY2016	FY2017
Registered (persons)	1	0	0
Transferred (persons)	0	0	0

Promoting the Regular Employment of Manufacturing Contract Employees

NGK established a system for appointing manufacturing contract employees to become regular employees, and 20 employees were appointed in fiscal 2017. Excellent employees are identified through biannual personnel assessments and recommended by division heads to sit for the regular employee promotion exam. Those who pass the exam become regular employees.

Excellent workers out of the ones who transfer to regular employment positions also have a chance for promotion to two higher ranks of company qualification. In fiscal 2017, six employees underwent accelerated promotion via this system.

Transfers from Contract Manufacturing Worker to Regular Employee

	FY2013	FY2014	FY2015	FY2016	FY2017
Converted (persons)	4	27	25	15	20

Accelerated Promotions

	FY2013	FY2014	FY2015	FY2016	FY2017
Promoted (persons)	7	4	11	11	6

Management of Follow-up System to Fit Young Employees in the Workplace

To prevent career mismatches, there is a follow-up system for younger employees in NGK. We conduct surveys and interviews about their jobs and the work environment to career-track employees in their second year and manufacturing technology staff in their third or fourth year of employment. If they desire, feedback is provided to their superiors, leading to younger employees' job stability. A job rotation system is also provided mainly to young career-track employees. After working with us for four years, they are transferred to a different job including overseas and outside of the departments to which they currently belong.

Come-Back System

In fiscal 2016, NGK launched the Come-Back System to rehire people who had left our company for various reasons (e.g., job change, studying abroad, job transfer of a spouse, etc.) as mid-career employees. In fiscal 2017, this system was used by one employee.

Reference
URL

Come-Back System

<http://www.ngk.co.jp/recruit/comeback/>

Work-Life Balance

To promote a work-life balance and reduce long working hours, in fiscal 2011, NGK formulated specific rules based on initiatives that had been conducted by labor-management over the previous three fiscal years.

We keep track of social changes, such as changing attitudes toward work as well as legislative amendments, and strive to respond to these changes flexibly and properly by improving systems and revising operations.

Nine Rules for Promoting a Work-Life Balance

- No more than 70 hours of overtime work per month.
- Overtime work exceeding 45 hours per month limited to six months each year.
- At least six days of paid leave must be taken each year.
- No more than 300 hours of overtime work per six months.
- In principle, there will be no overtime work on refresh days (Wednesdays and Fridays).
- If overtime is necessary, a prior permit application must be submitted.
- In principle, work must not be performed for more than seven days straight.
- If work in excess of seven days straight is necessary, a prior permit application must be submitted.
- Written applications must be submitted when requesting employees to work on holidays or late at night.

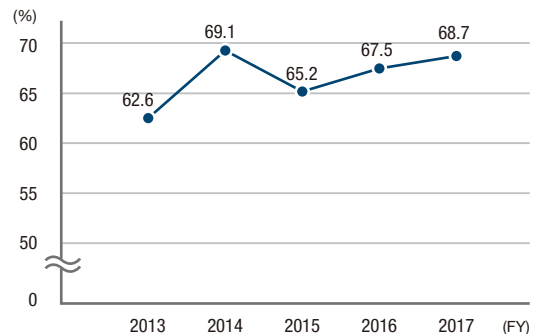
Initiatives to Limit Overtime Work

If, for any reason, overtime work in excess of 45 hours per month appears likely, the reason for the increase in overtime work must be confirmed through prior labor-management consultations to level out the time periods and workloads or increase the number of employees.

Countermeasures for Mitigating Increased Overtime Working Hours

Each year, NGK discloses statistics on hours worked and paid leave utilization to its Labor Union for discussion and countermeasure deliberation purposes. When cases of long working hours are found, Labor Union meets with each workplace to devise countermeasures. When long working hours are found for employees who have been temporarily assigned overseas, they must submit in writing the reason for the long working hours and undergo a health check. These measures are taken to maintain their health, and the written report is used to identify the reasons for long working hours and to develop countermeasures.

Rate of Paid Leave Utilization



For the fifth consecutive year, 99% of employees used six or more granted days of paid leave

For more than 10 consecutive years, the average number of days used for granted paid leave exceeded 10

For more than five consecutive years, usage of granted paid leave exceeded 60%

Enhancing Systems for Supporting Work-Life Balance

NGK offers flexible systems to help employees maintain a balance between work and family life. To support childcare and nursing care, we are enhancing financial support by providing a babysitter expense subsidy system, and a lump-sum payment system for nursing care support. And in consideration of the working environment, we offer support via a shortened working hour system.

Further, we continue to enhance the soft infrastructure NGK has in place to support these employees. For employees seeking to balance their career with childcare, we offer pre-maternity leave interviews, pre-reinstatement interviews during the childcare leave period, career consultations, and other consultation resources. For employees undertaking nursing care, we offer nursing care-related information sessions and distribute nursing care handbooks, as well as facilitate consultation services which make use of outside resources.

Enhancement of Work-Life Balance Systems

In 2010, NGK made a major revision to its human resource system, and we have since been continuously enhancing our support measures by identifying employees' needs. One recent example is the establishment of a system in 2013 to allow employees to take a leave of absence for accompanying a spouse posted overseas for work.

In fiscal 2016, we responded to the needs of employees who would like to gradually increase their working hours linking with their child's growth. The accommodation was made possible by relaxing restrictions set up for children's age for which the exemption from unscheduled work and limitation on overtime work apply. We have also introduced Childcare Concierge* services for employees working in the Tokyo metropolitan area, where it is difficult to find daycare centers.

In fiscal 2017, we established an early reinstatement lump-sum system for employees who return to work early from their childcare leave (within 11 months of the start of their childcare leave). We also established a non-registered daycare subsidy system to help subsidize employees who put their children in non-registered daycares. These systems are part of the initiatives we undertake to support employees' careers after they have returned to work. Also, in addition to childcare and nursing care, we launched a system for flexible work arrangements to help employees who need to attend to a health condition of their own that requires repeated and ongoing treatment, thereby finding a balance between work and medical care.

*Services to help facilitate the process of finding a daycare center and returning to work. They include tailored support for individual employees during childcare leave to help them find a daycare center and giving advice in preparation for their return to work.

System to Support Employees to Balance Work and Childcare at Each Stage

		Interview (employee, supervisor, and HR)		Interview (employee, supervisor, and HR)	
		During pregnancy	Before/after birth	During childcare leave	Balancing work and care
Work systems	Other systems	Measures on health management Overtime work exemption Late-night working hours exemption Flex time system	Time off before/after birth Special paid leave when a spouse gives birth Childcare leave (using accumulated vacation days)	Childcare leave Continuing the childcare leave	Shortened working hours Flex time system Unscheduled work exemption Limitation on overtime work Late-night working hours exemption Half-day paid leave Caring for a family member (using accumulated vacation days) Caring for a child
				Childcare Concierge (for those living in the Tokyo metropolitan area)	Priority use of a commuter parking lot (in Nagoya) Non-registered daycare expense subsidy
Financial support systems	Family Fund		Maternity gift		Babysitter expense subsidy Elementary school enrollment gift
	Insurance benefits	Health insurance	Lump-sum birth allowance		
		Employment insurance			Lump-sum childcare leave allowance
Salary			During the time off before/after birth, pay 2/3 of the standard daily wage	Unpaid	Lump-sum payment made six months after returning to work (330,000 yen)
Bonus			During the time off before/after birth, pay a bonus calculated with a 2/3 attendance rate	Unpaid	

Systems to Support Early Return from Parental Leave

NGK has systems to encourage and support employees who have taken maternity and childcare leave so that they can return to their careers at an early stage.

These systems are aimed at developing workplaces that support female employees in particular, with the expectation of promoting their active participation.

Systems to Support Early Return from Parental Leave

- A lump-sum payment for early return
- Licensed daycare center expense subsidy
- Childcare Concierge

Overview of Childrearing Support Measures and Users

Systems That Exceed Legal Requirements

System name	Details	Number of users					
			FY2013	FY2014	FY2015	FY2016	FY2017
Childcare leave	Until the last day of the month when the child turns one year old. When there are certain circumstances, such as not being able to find a daycare center, leave is available until the last day of the month in which the child turns 18 months old or the end of March after the child turns one, whichever is longer (Legal requirement: until the child turns 18 months old)	Women	40	52	49	44	36
		Rate of returned	94.1%	100%	100%	100%	– (On leave)
		Rate of employees still working a year after returning to work	100%	100%	100%	100%	– (On leave)
		Men	8	12	11	7	17
		Of which returned to work (Rate of returned)	8 (100%)	12 (100%)	11 (100%)	7 (100%)	17 (100%)
		Rate of employees still working a year after returning to work	100%	100%	100%	100%	–
Shortened working hours during childrearing	Six or seven hours per day for employees until the fiscal year when their children start fourth grade in elementary school (Legal requirement: For children under the age of three)	Users	38	43	53	57	51

Systems Operated Independently by NGK

System name	Details	FY2013	FY2014	FY2015	FY2016	FY2017
Lump-sum payment made six months after returning to work	Lump-sum payment is paid six months after returning to work	13	20	16	26	19
System for taking annual paid leave in hourly increments for employees working shortened hours	Paid leave can be taken in hourly increments by employees working shortened hours for five days	Unintroduced	18	35	36	36
Childcare leave for fathers	Unused annual paid holidays can be used for childcare leave	8	12	11	7	17
Pre-maternity leave interview	Interview is attended by employee, HR, and supervisor to provide the employee with peace of mind while on maternity leave and ensures both sides have proper understanding of procedures related to systems supporting childcare and work	23	25	22	20	27
Interview before returning to work	Supports smooth transition back to work through consultation on work details and work style	14	14	27	18	30
System for accompanying a spouse's overseas assignment	Enables employees to take a leave of up to two years and six months while accompanying a spouse (including a non-NGK employee) posted overseas for work, and allows employees to continue their career path, which was difficult to do prior to the establishment of this system	1	2	3	6	5
Maternity gift (Family Fund)	¥50,000 gift when a child is born	165	183	175	208	225
Elementary school enrollment gift (Family Fund)	¥50,000 gift when a child enrolls in elementary school	134	137	124	142	151
Babysitter expense subsidy (Family Fund)	Provides up to ¥100,000 per year for employees who must pay for a babysitter or daycare due to working hours	33	13	16	19	9
Childcare Concierge (for those living in the Tokyo metropolitan area)	Support to facilitate the process of putting a child in daycare and returning to work	Unintroduced	Unintroduced	Unintroduced	2	1
Priority parking spaces to support childcare (for those working at headquarters)	Priority parking spaces available at a commuter parking lot	No data	12	17	19	29

Systems to Support Nursing Care

Working hours	Time off	Financial support
<ul style="list-style-type: none"> ① Shortened working hours ② Working 3 days a week ③ Flex time system (for employees at departments to which the regular flex time system does not apply) ④ Limitation on overtime work ⑤ Unscheduled work exemption ⑥ Late-night working hours exemption 	<ul style="list-style-type: none"> ⑦ Caring for a family member using accumulated vacation days ⑧ Unpaid days off to provide care 	<ul style="list-style-type: none"> ⑩ Care leave benefits ⑪ Care leave support fund ⑫ Lump-sum care allowance
	Leave of absence	
	<ul style="list-style-type: none"> ⑨ Care leave 	

Nursing Care Leave Usage

	FY2013	FY2014	FY2015	FY2016	FY2017
No. of employees taking nursing care leave	0	0	0	0	1

Revision of the Care Leave System

In line with revisions made in January 2017 to the Child Care and Family Care Leave Act, we made revisions to our own system, such as enabling employees to divide their one-year nursing care leave into three blocks. Moreover, we have signed a corporate contract with SeaCare, an NPO that supports care-giving, to further enhance services helpful to caregivers.

This service makes care-giving consultations available free of charge, regardless of whether Certification of Needed Long-Term Care has been obtained, and enables employees to receive support in care-giving when they are unable to do so.

Company Intranet

We have launched a site on diverse work styles on the company intranet to widely announce our measures to support a work-life balance. The new site is a redesigned and more user-friendly version of the previous Work and Family Life Support Site. Its new features include, for example, an online handbook on childcare and nursing care.



Ministry of Health, Labor and Welfare
Next-generation support certification logo "Kurumin" (2012)



Ministry of Health, Labor and Welfare
"L-boshi" certification of corporate excellence in the promotion of women's active participation Certification level 2 (2017)



Nagoya City
Certification of corporate promotion of women's active participation (2011)



Aichi Prefecture
Certification of Aichi "Shining Women" Companies (2016)

Awards Received in Fiscal 2017

NGK received a variety of awards for its initiatives aimed at promoting women's active participation, as well as supporting work-life balance for childcare, nursing care, and illness.



Aichi "Shining Women" Company Outstanding Company Award (received from Aichi Prefecture on November 27, 2017)



Fiscal 2017 Excellent Equal Opportunity & Work-Life Balance Companies Awards; Minister of Health, Labor and Welfare Prize for Excellence; Family-Friendly Company Category (received on December 15, 2017 from the Ministry of Health, Labor and Welfare)



Fiscal 2017 Aichi Prefecture Family-Friendly Company Awards; Family-Friendly Company Award (received from Aichi Prefecture on February 13, 2018)

Human Resource Development

At NGK, people are our most precious management resource. With respect for employee motivation and ambition, we engage in the cultivation of human resources who will lead the next generation. In recent years, NGK has concentrated efforts on the enhancement of training to develop future leaders to take management positions as well as globally minded personnel to support our overseas business expansion.

In fiscal 2017, we accompanied our reforms of the personnel system, such as raising the mandatory retirement age and promoting greater work-life balance, with programs aimed at fostering greater employee motivation and activity. Specifically, we offered training to promote autonomous career design for older staff, career path lecture courses aimed at fostering greater diversity, and training in how to perform interviews with subordinates.

Systematized Personnel Development in Four Areas



Promoting Systematic Education through Nearly 120 Programs

Using the major career milestones, such as joining the company or getting a promotion, as opportunities for career training, we have instituted and are systematically implementing training in four areas. In addition to required job grade-specific training, we have introduced around 120 different types of programs that run during the year.

Within the area of management training, examples of the programs we run the “Management Basics” training seminar, which teaches employees about the essential aspects of management, and the “Career Design in Your 50s” training seminar, which promotes autonomous career design among older employees. Manufacturing training programs include those that fall under the category of worksite capability enhancement and supervisor training, as well as ongoing training programs aimed at equipping young employees with the basics of ceramics manufacturing, such as materials, molding, working, drying, and firing ceramics. Within the area of global training, in tandem with foreign language instruction, we instruct employees in understanding different cultures, in how to give effective presentations, in business skills related to international law and labor management, in health and safety management, and in compliance-related matters.

In business skills training, we not only provide training in skills essential to the company’s needs, we provide a variety of growth opportunities that employees cannot experience in the course of their normal duties, such as opportunities for exchange and interaction with outside employees via training conducted in collaboration with other companies.

Training Participant Summary (total participants)

	FY2014	FY2015	FY2016	FY2017
Key personnel, men	960	876	903	1,093
Key personnel, women	30	16	30	39
General employees, men	2,752	2,775	2,697	2,426
General employees, women	302	321	372	331
Men (total)	3,712	3,651	3,600	3,519
Women (total)	332	337	402	370

Average Time Spent in Training Annually per Employee (hours)

	FY2014	FY2015	FY2016	FY2017
Men	22	21.8	25.5	22.2
Women	14	15.4	20.3	18.5
Key personnel	15	15.3	13.1	15.6
General employees	23	22.5	28.8	23.3

Average Annual Cost of Training per Full-Time Employee (¥10 thousand)

	FY2013	FY2014	FY2015	FY2016	FY2017
Average expenses	11	11	7.8	7	6.6

Note: Calculated based on actual achievements from FY2015.

FY2017 Training Scheme

Management	Group S	Group M	Group J	New hires				
Management 2	Global Leadership Motivation Management Quality/cost Management	Women's Career Design	2nd-year Group J staff	2nd-year Group J technical	Cross-cultural Communication Clubset	All divisions	Position-based	Career Education
Management 3 / E-learning	Cross-cultural Communication Innovation	Women's Career Design	2nd-year Group J technical	2nd-year Group J technical	Introduction			
Management 4	New Group S	Promoted to J1	Group J staff	Group J clerical		All divisions	Senior Manager Development	Management Training
Business Leader III	Business Leader I					All divisions	Management	
Business Leader II								
Women's Participation Supervisor	Cross-industry Exchanges					All divisions	Quality, Cost	Manufacturing Training
Basic Management								
	Quality Management	Quality Control II	Quality Control I	QC Basics		Engineering	Manufacturing, Worksite Capabilities	
	Cost Management	Basic Quality I	Basic Quality II	Data Analysis				
		Basic Quality III	Basic Quality II	Group J clerical	Group J technical	Manufacturing	Manufacturing, Worksite Capabilities	
Risk Prevention II	Risk Prevention I	Worksite IE Basics	Worksite Capability Leaders	Basic Manufacturing	Group J staff / technical	All divisions	Introduction	Global Training
	Section Chiefs	Worksite Leaders				All divisions	Global Seminar	Business Skill Training
	Follow-up of Trainees							
Plant Managers	Managers	Instructors				All divisions	English	Ideas and Logic
		Practical Overseas Training				All divisions	English	Other
						All divisions	Introduction	Business Skill Training
						All divisions	English	Other
						All divisions	English	Other
						All divisions	Global Seminar	Business Skill Training
						All divisions	Global Seminar	Business Skill Training

Legend

- Selecting trainees based on employment status such as new hires, promotion, and service years (position-based training)
- Selecting trainees based on job title and position
- Selecting trainees by screening or need
- Open application

Quality Improvement Training for Manufacturing

In line with a younger workforce and an increase in mid-career hires coming from a variety of backgrounds, it is necessary to create training programs that cover a variety of needs. Given these conditions, we provide quality improvement training for employees in manufacturing divisions in five categories of content corresponding to job type and professional background. The instruction and exercises are tailored to the participants' level of understanding and job type.

Number of Participants in Quality Improvement-Related Training in FY2017

Leader training for worksite capability enhancement	10
Leader training for worksite capability enhancement at the Ishikawa Plant	7
Follow-up training for worksite capability enhancement	144
Instructor development training for worksite capability enhancement	2
Instructor brush-up training for worksite capability enhancement	8
Worksite IE basics	12
Quality control I	29
Quality control II	76

Measuring Human Resource Development Achievements Using Quantitative Indices

We introduced quantitative indices to objectively evaluate the results of human resource development. We aim to accelerate employee skills development by making use of these objective evaluations.

Quantitative Indicators to Measure the Outcomes of Human Resource Development

- Assessments of understanding and satisfaction levels using post-training surveys
- Checking the achievement level by the TOEIC test and instructors (native speakers of the target language)
- Tests during and after the training
- Calculated cost of loss
- Evaluation scores by judges, etc.

On-Site Leader Development

We cultivate leaders who are motivated to pursue improvement, and this is done through the systematic promotion of worksite capability training. This training focuses on the fundamental elements of manufacturing, namely safety, environment, quality, deadlines, and cost, and is carried out within a framework that transcends just the factory itself.

Progress of Training Aimed at Strengthening Worksite Capabilities

Fiscal 2013	12 employees who completed leader training attended. In addition to the 13 employees already trained, the total number of instructors reached 25.
Fiscal 2014	We held training to brush up skills of trained instructors. As of fiscal 2013, a total of 21 employees had participated in instructor development training. To further enhance skills, improvement activity examples were shared and examples from all plants were collected to create in-house case studies.
Fiscal 2015	Employees who had completed in-house instructor development training served as lecturers. The contents of training programs were formulated by the instructors in charge of each program, and they incorporated their worksite experiences as instructors. Using case studies, they taught things such as cost reduction methods.
Fiscal 2016	The content of leader training for worksite capabilities was revised by the in-house instructors to enhance individual guidance. The revised textbooks were also shared with Group companies.
Fiscal 2017	The companies of the NGK Group collaborated together to invite outside instructors, conduct on-site training, and offer opportunities for interaction and mutual learning amongst companies. We also began trialing instructor-led training overseas.

In fiscal 2011, NGK began training for all manufacturing site worksite leaders aimed at improving the leadership qualities and communication skills of on-site leaders that guide and cultivate younger employees.

In fiscal 2017, 29 newly appointed worksite leaders underwent training on labor management and recognition of the role of the worksite leader.

We evaluate effects of the improvements made through the training in financial terms by converting them into specific monetary values.

FY2017 Training Results

(Persons)

Leader training for worksite capability enhancement: 18 days	10 completed
Brush-up training: 2 days	8 completed
Worksite leader training: 2.5 days	29 completed
Financial effects of the improvements through the training (total amount)	41.18 million yen
Financial effects of the improvements per person	4.58 million yen

Voice of an In-House Instructor

Deployment to Overseas Plants

NOx Sensor Production Supervisor, NGK Ceramics Polska (Poland)

Takuzo Shikimachi

I was assigned to the position of Production Supervisor three years after the Poland plant went on line. Although the plant's yield was steadily increasing, there was also a lack of clarity in standards and on-site rules, with sporadic defects and careless mistakes occurring on a daily basis. The local team members and I worked together closely and tenaciously to overcome language barriers, as well as a difference in approach to working hours, in order to address these issues. I do not consider the specific improvements we made to be the real achievement; rather, it is the fact that we put in place a localized system for the implementation of improvements. For this I am extremely grateful to the local team members who worked together with me.

In overseas manufacturing, when we, as leaders, seek to gain the trust of local staff in working with us to realize improvements, I believe it is essential that it be done via activities that become thoroughly integrated into local operations. For the sake of all my colleagues within the NGK Group, I will continue working to find and introduce best practices that produce results and enjoyably lead toward ongoing improvement.



English Instruction for New Employees

With the aim of rapidly cultivating global human resources, we began English language instruction in fiscal 2011 targeting all new Group J (staff) hires.

The training is provided for one year, consisting of foundation development training led by Japanese instructors and training to develop practical business skills led by native speakers according to individual achievement levels. Participants not only study but also undertake activities of their own initiative, such as creating their own class slogans.

Further, global mindset training, individual counseling, and study guidance are provided to heighten employees' awareness of globalization and enhance their motivation. In fiscal 2017, we also introduced monthly review testing to facilitate employees' continued learning.

Time spent learning English
per new career-track hire
(fiscal 2017 results)

120 hours per year

Practical Overseas Training

NGK conducts practical training over a period of six months at overseas Group companies with the aim of developing globally minded human resources. The training focuses on developing practical business and communication skills in a cross-cultural environment targeting young employees who are future candidates for overseas postings.

Labor-Management Initiatives

Labor Union

NGK respects workers' rights, including the right to collective bargaining, and strives to build healthy labor-management relations. As of the end of March 2018, 3,525 employees belonged to the Labor Union.

Protecting the Right to Collective Bargaining

NGK and the Labor Union have signed a labor agreement as equal partners. The agreement specifies that both parties shall respect each other's rights and take responsibility for the exercising of their own rights.

The two sides regularly hold Labor-Management Advisory Board meetings to exchange information and promote mutual understanding. They also maintain healthy labor-management relations by exchanging opinions on issues such as management policies, financial conditions, and activities of the Labor Union.

Collective bargaining sessions are held in an orderly manner, with both parties striving in good faith to resolve issues peacefully and promptly.

Labor-Management Consultations in Fiscal 2017

Regular Labor-Management Council meeting: held twice

Labor-Management Advisory Board meeting: held twice

Other bargaining and consultations

- Consultation on overtime work and work on days off
- Consultation on revision of the agreement
- Consultation on measures to rectify long working hours

Guaranteeing the Minimum Wage

NGK and the Labor Union have signed an agreement that sets out original in-house minimum wages, which are fixed at a rate above the minimum wages by region and industry stipulated by the Minimum Wage Act. Through this agreement, we strive to improve employees' working conditions and avoid violation of relevant laws.

Communication between Labor and Management

NGK makes an effort to build labor-management relations founded on mutual trust through communication with various consultative bodies, such as the Labor-Management Advisory Board, the Worksite Advisory Board, and the Regular Labor-Management Council.

NGK and the Labor Union hold Labor-Management Advisory Board meetings to talk about business conditions and performance, and Worksite Advisory Board meetings to share issues pertaining to manufacturing, work systems, and workplace environments from each worksite. In addition, at Regular Labor-Management Council meetings, labor and management also proactively exchange opinions.

Survey on Workplace Vitality

Once every two years NGK carries out a survey aimed at gauging and visualizing workplace vitality. The results of the survey serve as basic data, which facilitate discussion about personnel-related initiatives to create a more work-friendly organizational environment that offers employees a sense of challenge. In addition, the results for each workplace are provided as feedback to the respective managers to help them improve the daily workplace environment.

Human Rights Initiatives

Having established respect for humanity in its Guidelines for Corporate Behavior, the NGK Group uses its intranet, which is available to all domestic Group company employees, to explain and disseminate the United Nations “Universal Declaration of Human Rights”^{*1} and “Guiding Principles on Business and Human Rights.”^{**2} Taking the signing of the UN Global Compact in 2015 as an opportunity, NGK has been actively spreading awareness for protecting human rights by holding seminars on the subject.

*1: Adopted on December 10, 1948 at the Third United Nations General Assembly Session, this declaration expresses the rights to which all human beings in all nations are inherently entitled (General Assembly Resolution 217 (III)). The formal name is the Universal Declaration of Human Rights.

**2: Based on the “Report on Human Rights and Transnational Corporations and Other Business Issues” by John Ruggie, UN Secretary-General’s Special Representative for Business and Human Rights (at that time).

Reference Page **Compliance Education** P120



The UN Global Compact is a global framework for realizing sustainable growth through companies and organizations acting as good members of society. Participating corporations support ten principles in the areas of human rights, labor, the environment, and anti-corruption required in the practice of corporate activities.

The Ten Principles of the UN Global Compact

Human Rights Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
Principle 2: make sure that they are not complicit in human rights abuses.

Labor Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
Principle 4: the elimination of all forms of forced and compulsory labor;
Principle 5: the effective abolition of child labor; and
Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment Principle 7: Businesses should support a precautionary approach to environmental challenges;
Principle 8: undertake initiatives to promote greater environmental responsibility; and
Principle 9: encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Eliminating Harassment

When hiring or promoting personnel to key positions, NGK provides these personnel with harassment elimination training.

Harassment Elimination Training

	FY2013	FY2014	FY2015	FY2016	FY2017
Sessions held	4	6	11	6	5
No. of participants	189	203	277	326	350

Commencing Human Rights Due Diligence

The NGK Group has commenced human rights due diligence across the Group as of fiscal 2016. Human rights due diligence is a step that should be taken by companies in order to recognize, prevent, and address negative impacts on human rights. It involves the formulation of policies related to human rights, assessment of impacts of corporate activities on human rights, and follow-up and disclosure of performance results.

In reference to the RBA (Responsible Business Alliance) Code of Conduct and the United Nations' Guiding Principles on Business and Human Rights, the NGK Group set specific survey items with support from external consultants. We embarked on the activities involving Group companies in Japan in November 2016. In fiscal 2017, we gradually expanded the scope of activities to our headquarters and overseas Group companies.

Implementation of Fair, Free, and Transparent Transactions

With a basic policy centered on the three principles of openness and fairness, partnership, and relationship with society, the NGK Group is engaged in fair and honest business transactions with the procurement partners in our supply chain.

Basic Approach

The NGK Group has established the Basic Purchasing Policy in an attempt to conduct fair and honest business transactions and to prosper together with all our procurement partners.

Supply Chain Management System

At NGK, the Purchasing Department is responsible for managing suppliers based on the Supplier Management Regulations. Management targets cover all the tier 1 suppliers and selected critical suppliers among tier 2 and beyond, including raw materials manufacturers.

Reference
Page

Communication Activities with
Procurement Partners

P99

Basic Purchasing Policy

Open and Fair

- Open, fair, and honest procurement
- Pursuit of the competition principles and profitability

Partnership

- Mutual prosperity based on mutual trust with suppliers

Relationship with Society

- Compliance with laws
- Preservation of the global environment

Familiarization of the Purchasing Handbook

Purchasing operations are directly related to various important aspects of corporate management, such as assets, production, development, and business performance, and also involve external and financial activities, major areas prone to compliance issues. In light of this, we created the Purchasing Handbook to summarize internal rules for purchasing engagement and issued the first edition of it in fiscal 2007. The Handbook has since been reviewed every year.

Efforts have also been made to better familiarize personnel with the tool: it has been made available on the company intranet and its significant objectives are discussed in company training programs, particularly for new managers.



Fair and Honest Procurement Partner Evaluations and Extensive Resource Diversification

In accordance with the Basic Purchasing Policy, NGK selects procurement partners based on fair and honest evaluations. We also attempt to ensure procurement when disasters occur through the extensive diversification of procurement resources.

Selection of Suppliers Based on Fair and Honest Evaluations

NGK opens its doors to a wide range of procurement sources, including companies with which it has had no previous transactions.

In terms of selecting new suppliers, we choose from multiple companies through fair and honest evaluation of their CSR initiatives, environmental conservation efforts, and financial condition as well as quality, cost, and delivery (QCD). In addition to the procurement department being involved in the selection of suppliers, multiple departments are also involved in this process, which requires multi-stage approval before selection occurs in an effort to ensure fair and honest evaluation and decision-making.

Promoting Business Continuity Planning (BCP) through the Diversification of Procurement Resources

In the event of unforeseen circumstances such as a major natural disaster, NGK promotes the sourcing of raw materials, equipment, secondary materials, and other critical purchased parts from multiple suppliers as part of its BCP efforts to ensure procurement is uninterrupted. For items which are available from only one supplier, we are in the process of ensuring sufficient inventory and that the storage facilities for these items are located in a safe place that cannot be damaged by tsunamis. In addition, when selecting a new procurement partner, we take into consideration the existence or absence of multiple locations and efforts to ensure inventory.

Promotion of CSR Procurement

In response to the rising social expectation for CSR-oriented supply chain management, the NGK Group promotes CSR procurement. We preferentially select CSR-conscious companies and purchase CSR-sensitive raw-materials and services.

CSR Procurement Guidelines

The NGK Group created the CSR Procurement Guidelines in fiscal 2010 as a guide to promote CSR procurement across the Group including overseas Group companies. The Guidelines specifically describe our obligations as a socially responsible buyer as well as our requirements for socially responsible suppliers. In fiscal 2013, the Guidelines were expanded by being integrated with the previous Green Procurement Guidelines, which set forth rules for preferential purchase of environmentally friendly products and services, and adding provisions of conflict minerals, anti-corruption, human rights, and labor issues.

The expanded CSR Procurement Guidelines are publicly available on our website in multiple languages (Japanese, English, and Chinese).

Reference URL

CSR Procurement Guidelines and Supplemental Materials

<http://www.ngk.co.jp/english/about/procure/>

Procuring Resources and Raw Materials Responsibly

The NGK Group conducts procurement activities that consider impacts on regional communities stemming from the use of raw materials (e.g. conflict minerals*) with the potential to cause social issues such as human rights violations and poverty, and takes steps to avoid using such materials when there is risk of adverse impact.

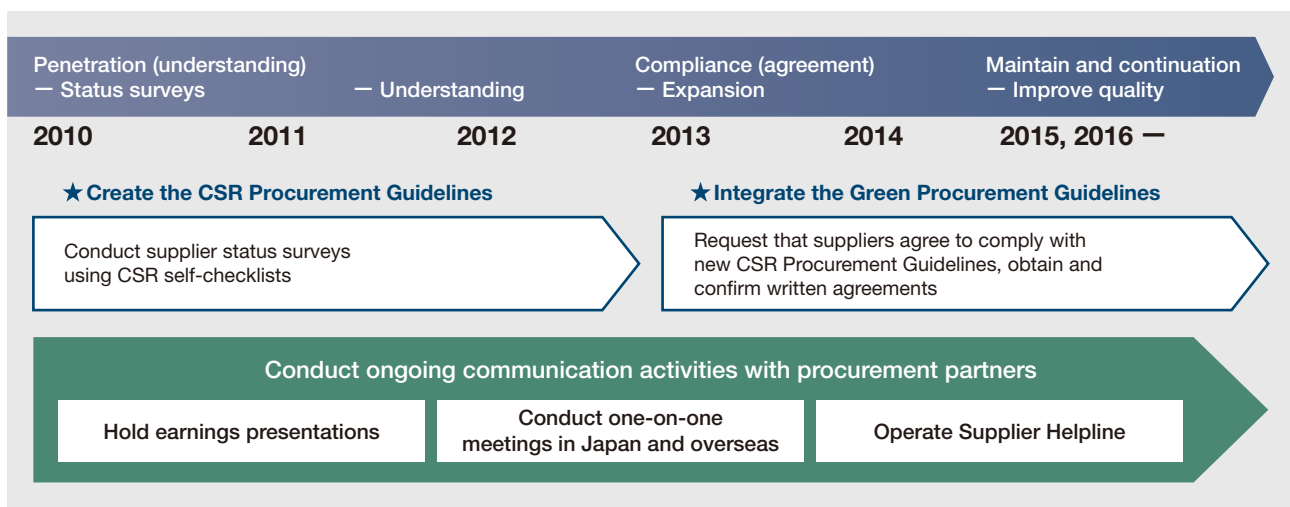
*Minerals including tin, tantalum, tungsten, and gold produced in the Democratic Republic of the Congo and surrounding countries, and used as a source of funding for armed conflict in the area.

Improving CSR Procurement

At the NGK Group, we develop activities to promote CSR procurement, such as visiting individual suppliers and conducting on-site inspections. We also request our suppliers, particularly new companies, to sign an agreement to comply with the CSR Procurement Guidelines. From fiscal 2016, we ask for annual renewal of the agreement in an effort to facilitate suppliers' awareness and understanding of CSR procurement while striving to increase the number of signers.

We will continue with these efforts, confirming partners' activities and keeping up with social trends, in order to maintain and enhance our CSR procurement.

Ongoing Promotion of CSR Procurement



Enhancement of Procurement Capabilities of Overseas Group Companies

Helping with Construction of Overseas Group Company's Purchasing System

When NGK Ceramics (Thailand) was starting up, we helped it put in place a purchasing system.

Members of the Purchasing Department were sent to Thailand, where they worked with local management and purchasing staff members to develop purchasing compliance and governance procedures tailored to local conditions and to then construct a purchasing system.

We will continue to support local management and purchasing staff via activities that improve local purchasing capabilities, such as procurement task streamlining, client management, and buyer up-skilling training.

Conducting Logistics Liaison Meetings

We invited the logistics representatives from NGK Ceramics Polska (Poland) to the NGK headquarters in Japan to participate in an information exchange meeting.

Topics of discussion included the two companies' logistics-related challenges, cases of improvement, and requests and expectations of one another. Afterwards, the representatives were taken to visit warehouses, airports, harbors, and other logistics sites.

The importance of logistics between NGK in Japan and NGK Ceramics Polska has grown as product shipments from NGK Ceramics Polska continue to rapidly expand, and it is in this context that our two companies have strengthened their communication, gleaning key insights from one another which have helped foster more efficient operations.

Local Communities

The NGK Group is concerned about social issues in all nations and regions. We engage in social contribution activities in response to needs in each region in an aim to become a corporate citizen trusted by local communities.

Basic Approach

The NGK Group promotes social contribution activities based on the following concepts.

Focus of Activities

Centered on people and education, the environment, and community involvement.

Company Activities and Employee Involvement

- NGK provides employees with opportunities to experience activities.
- NGK proactively encourages individual activities to engender employee satisfaction and a sense of confidence in the company.

Information Disclosure

NGK promotes an understanding of activities and provides activity information to inculcate a social contribution mindset among employees.

Social Contribution Activity Promotion System

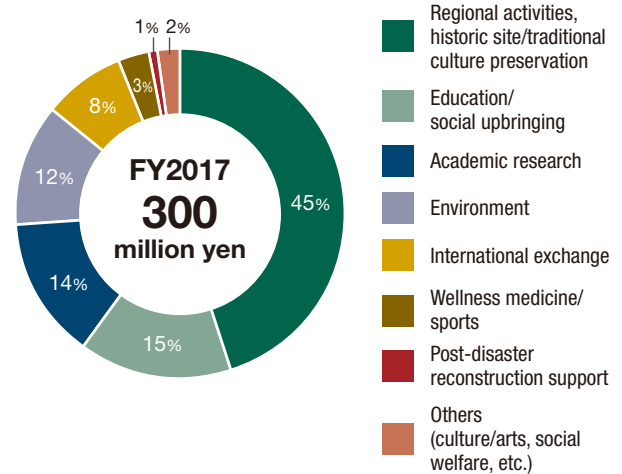
At the NGK Group, social contribution activities are promoted under the leadership of the Social Contribution Subcommittee, which is chaired by the general manager of the General Affairs Department and reports to the CSR Committee.

NGK collects reports from Group companies in and outside of Japan on their activities. In fiscal 2017, a total of 70 reports were received.

Social Contribution Activity Promotion Status

	FY2014	FY2015	FY2016	FY2017
Social contribution expenditures	331 million yen	346 million yen	315 million yen	300 million yen
Number of social contribution programs	8	9	10	10
Number of collaborations with NPOs/NGOs	5	4	4	4

Breakdown of Activities



Providing Scholarships and Assistance to International Students

NGK established the NGK Foundation for International Students in order to facilitate the cultivation of individuals who will contribute to the development of the international community. It is through the Foundation that NGK is helping to provide housing and scholarships to overseas students visiting Japan.

The impetus for the Foundation’s establishment stems from gratitude for the warm community support and hospitality shown to NGK’s first employees and families posted overseas at the time of its initial overseas expansion back in the 1930s. Our activities are conducted in the hope that the students will feel glad that they came to Japan and develop a fondness for the country.

In fiscal 2017, we provided housing to 39 students from 11 countries, and scholarships (non-repayable) to 20 students from 13 countries.

Reference URL

The NGK Foundation for International Students

<http://www.ngk.co.jp/english/csr/philanthropy/>

Exchange between Supported Students, Communities, and Employees

NGK organizes a variety of events and programs to provide opportunities for grassroots international relations between supported students, regional communities, and employees. Language classes taught by international students have been held annually since 2000, and cross-cultural exchange meetings where international students introduce their native countries have been held annually since 2006.

In fiscal 2017, 12 Korean language class sessions were held. Additionally, there were eight cross-cultural exchange meetings alternately hosted by different exchange students to introduce their different home countries. Through these events, participating students and local residents were able to enjoy meaningful exchange. As of fiscal 2017, a cumulative total of 960 people have participated.

Number of Participants in International Programs

	Korean language class	Cross-cultural exchange
International students	3	12
Local residents	24	20



Korean cultural exchange event (October 2017)

Communication after Support Ends

To maintain relationships with international students after support ends, each year, we send out a New Year’s greeting card that includes a company status report to former and current students.

We also distribute NGK International Friendship Club Members Cards that include our contact information to international students after support ends.

In fiscal 2017, we sent New Year’s cards with updates on the Foundation and NGK to around 300 students who have received support in the past.

TOPIC

A Place Where Students from around the World Live, Learn, and Laugh Together NGK International House

“Except for weekends, I am in the laboratory until 11:00 p.m. every day. My room at the NGK International House has a big desk and is good for studying. When I get tired, I go out onto the balcony to get some air.”

The speaker is Edwin Akandwanaho, a student from Uganda (right). He is studying road traffic at Nagoya University’s Graduate School of Environmental Studies.

Alexia Fabiani is from Italy (left), and she is studying physics at Nagoya University’s School of Science. “It’s safe and quiet here, and all the residents are nice people. When you live on your own it’s hard to make friends, but that’s not the case here. I can meet friends easily.” On days off the international students gather in the common kitchen area and cook. The students often share what they cook with one another.



Achievements

Number of overseas students supported: 779 (1997–2017)

Total language class and intercultural event attendance: 964 (2000–2017)

Note: Language classes started in 2000 and cross-cultural exchange meetings started in 2006.

Social Contribution Activities in Collaboration with Local Communities and NPOs

Aiming to be a corporate citizen trusted by local communities, NGK collaborates with communities and NPOs to engage in social contribution activities in response to regional needs. In addition, employee volunteers from NGK Group companies in Japan and around the world conduct a variety of social contribution activities rooted in their local communities.

Reference
URL

Read more about NGK's social contribution activities at:
<http://www.ngk.co.jp/csr/social/stakeholder/activity/>

Social Contribution Activities by NGK

Offering Workplace Experience to Junior High School Students from Rikuzentakata City

NGK took part in the workplace experience program offered to junior high school students from Rikuzentakata City, sponsored by the Nagoya City Board of Education. Two Rikuzentakata junior high school students visited NGK's main plant, where they were welcomed by President Taku Oshima and given a first-hand look at plant operations, such as the unloading of HONEYCERAM® products from kilns.

This program is conducted in line with the "total support" initiatives that Nagoya City undertakes towards Rikuzentakata City, which suffered immense damage as a result of the Great East Japan Earthquake. NGK has taken part in this program each year since 2016.



Hosting the Komaki Summer Festival

NGK's Komaki Site hosted the annual Komaki Summer Festival, with around 1,600 local residents, employees, and their families taking part.

A stage was set up to feature Japanese drummers and buskers, as well as specially invited local singers performing popular songs. Vendors set up food stalls to sell yaki-soba noodles, Mitarashi dumplings, and other foods, and there were game booths featuring ball scoop challenges and other fun diversions. A limited supply of hand fans bearing raffle numbers were also distributed and used to select gift raffle winners, capping off an exciting event.



Social Contribution Activities by Group Companies in Japan

NGK Filtech Sponsors Local Festival

NGK Filtech, Ltd. was a sponsor of the 62nd Ooka Echizen Festival held in Chigasaki City. This event has taken place every year since 1956*, and as part of contributing to the community as a local company, NGK Filtech has been an event sponsor since 1992, one year after the company's founding (September 1991).

*The origin of the festival dates back to the ceremony performed at the Jokenji Temple in front of the grave of Ooka Tadasuke in 1912 to posthumously confer an honorary title upon him. The festival was disrupted by the Great Kanto Earthquake and numerous wartime interruptions; however, in 1956 it was resumed under the new name of the Ooka Echizen Festival.



Hosting the Energy Support Cup Women's Volleyball Tournament

Energy Support Corporation held the 25th Energy Support Cup Women's Volleyball Tournament at the Energy Support Arena. The tournament showcased white-hot competition amongst 12 teams from Inuyama City. The company has supported this competition for 25 years as a means of contributing to the local sporting community.



NGK Sports Planning Helps with Sporting Activities for the Disabled

NGK Sports Planning Co., Ltd. is supporting the activities of the Aichi branch of the Special Olympics Nippon Foundation, which organizes sporting competitions for those with intellectual disabilities, by making the Moronoki Tennis Club's playing court available for use free of charge. NGK Sports Planning has offered the court as a competition training location for nine training sessions during the spring and autumn each year since 2015.



NGK Electronics Cleans Up Local River

NGK Electronics Devices, Inc. undertook cleanup efforts along the Mugi River, which flows through the site of the head office factory. The cleanup was performed by three members of the Environmental Promotion Committee as part of the June Environmental Month activities. The participants spent around an hour walking along the river and picking up trash.



Soshin Powertech Participates in Evacuation Drill at Aged Care Facility

Four employees of Soshin Powertech Co., Ltd., which is part of the Soshin Electric Group, assisted with an evacuation drill held at a local aged care center.

This evacuation drill is held once every six months and is assisted by local residents, businesses, and public groups. The drill simulated a daytime fire emergency, with participants helping those in wheelchairs to evacuate the building.



Social Contribution Activities by Overseas Group Companies

NGK Electronics Devices Malaysia Takes Part in Blood Drive Activities

A total of 81 employees from NGK Electronics Devices Malaysia (NGKMY) took part in a blood drive held at the NGKMY head office. Thanks to widespread, advance announcement to stimulate interest amongst employees, participation was almost double that of the previous fiscal year.



NGK Ceramics Polska Participates for 2nd Consecutive Year in Charity Run Held by Support Organization for the Disabled

For the second year in a row, employee volunteers from NGK Ceramics Polska Sp. z o.o. took part in the Katowice Business Run charity run held in the city of Katowice, Poland. This event has been held each year since 2011 and is organized by a support organization for the disabled. All participant fees are put to use to help the disabled, with this year's monies going towards the purchase of prosthetic legs.



NGK Metals Installs Ramp at Local Retirement Home

Employee volunteers from NGK Metals Corporation in America visited a retirement home in the nearby city of Madisonville, Tennessee to help install a ramp at the home's entrance.

The project was undertaken in collaboration with United Way, an American charitable organization, and the five NGK Metals employees were responsible for the ramp's installation. The group of employees, who were mostly former carpenters, took a day to inspect the site, purchase materials, and then install a fine new ramp.



NGK Ceramics Mexico Helps Victims of the 2017 Central Mexico Earthquake

In the terrible aftermath of the Central Mexico Earthquake which struck in September 2017, NGK Ceramics Mexico, S. de R.L. de C.V. (ACM) found volunteers to donate food, daily necessities, and other items to victims. The donated items were delivered to the victims through the Mexican Red Cross in Monterey, the capital city of Nuevo León, where ACM is located.



Support for Volunteer Activities by Employees

The NGK Group proactively supports activities and provides information to create opportunities for employees to participate in volunteering outside the company.

Volunteering to Teach Children About the Wonders of Science

As a manufacturer, NGK engages in various activities to spark children's interest in science. In 1997, we started running the "NGK Science Site: Experiments at Home Series" as a regular feature in a science magazine. We also maintain a dedicated website which is updated monthly.

Children's interest is piqued through the use of featured experiments that are supervised by experts and which address interesting and relevant topics. These experiments utilize familiar, everyday materials like plastic bottles, dry cell batteries, vegetables, and condiments and are explained in detailed steps.

Since 1998, the experiments introduced on the NGK Science Site have been demonstrated at the Youngsters' Science Festival in Nagoya (hosted by the Japan Science Foundation) and other local science events. Every year, NGK employee volunteers set up a booth to present a science lab. To date, roughly 40 sessions have been presented, attracting a cumulative total of 20,000 children and their parents.

Reference
URL

NGK Science Site
<http://site.ngk.co.jp/>

Christmas Lectures Convey the Wonders of Science

We took part in the 2017 Royal Institution Christmas Lecture (sponsored by the Yomiuri Shimbun news corporation and the Tokyo Institute of Technology), which is an annual event aimed at conveying the wonders of science to children. At the 2017 Christmas Lecture we showcased the amazing capabilities of our NAS batteries. This popular series of lectures began in the U.K. around 200 years ago and serves as a "Christmas present" from scientists to young people. This format has been replicated in Japan, with NGK taking part each year since 2011. The theme of the September 2017 lectures was energy. Our NAS batteries were heavily showcased as a model for the future of secondary batteries, with NGK employees serving as guest lecturers to provide an easy-to-understand explanation to children and students about what makes these batteries so special.



Collaborating with the Labor Union to Conduct Social Contribution Activities

Relief Assistance for Victims of Northern Kyushu Storm Disaster

In July 2017, the NGK Group donated one million yen for disaster victim relief and local recovery efforts following the storm disaster in northern Kyushu. Additionally, a collection effort led by the NGK Labor Union raised 1.07 million yen, which was combined with a matching gift of 1.10 million yen from NGK to provide a 2.17 million yen donation in August (3.17 million yen in total).



Participating in the Fukushima Sunflower Project

The NGK Labor Union participated in the Fukushima Sunflower Project. Participants become “foster parents” to sunflowers by purchasing seeds, growing flowers from them, and harvesting the seeds. The project aims to help the people of Fukushima connect with the rest of the world, make sure the earthquake/tsunami disaster is never forgotten, and create employment in the prefecture, including for those with intellectual disabilities.

In fiscal 2017, the sunflowers grown from seeds planted by NGK employees to support recovery efforts after the Great East Japan Earthquake were still blooming at the Nagoya, Chita and Komaki sites, as well as at the Ishikawa Plant.



Interacting with Local Communities

The NGK Group engages in dynamic interactions with local residents through opportunities such as plant tours and regional events, as well as through opportunities for direct dialogue, making an effort to incorporate the ideas and opinions received in Group business activities and CSR activities.

Plant Tours

Interactions with Children and Local Residents

NGK attempts to interact with local communities through plant tours to deepen interest in and understanding of NGK and manufacturing. In fiscal 2017 we conducted 10 plant tours at our three sites and the Ishikawa Plant for a total of 253 participants consisting of elementary school students and local residents.

Plant Tours in Fiscal 2017 (NGK)

	Participants	Details
Nagoya Site	30	International students from the NGK Foundation for International Students
	11	Toyohashi City Takashidai Junior High School
	30	Aichi Prefecture Kozoji Senior High School
	5	Rikuzentakata City junior high school students
Chita Site	50	Local resident plant tour group
Komaki Site	7	Aichi Prefecture Kasugai-nishi Senior High School
	10	Mayors of neighboring wards
Ishikawa Plant	39	Ishikawa Technical Senior High School
	17	Nagoya "Friday Club"
	54	Japan Radio Institute

TOPIC

Chita Site Plant Tour for Local Residents

In November 2017, we invited local residents to come and tour the Chita Site, and this invitation was accepted by 50 people. These tour groups have been arranged annually since 1984 in order to help us establish stronger communication with local residents, whom NGK considers key stakeholders.

These tours help local residents better understand NGK's production and business activities.



Participants listen to an explanation of the beryllium-copper manufacturing process



A commemorative photo taken in front of one of the world's largest insulating tubes

Communication with Stakeholders

The NGK Group promotes shareholder-oriented management emphasizing capital efficiency across the entire Group and strives to improve corporate value with the goal of realizing sustainable growth.

Basic Approach

NGK is engaged in the maximization of corporate value through two-way communication with shareholders and investors, including efforts to provide accurate and timely explanations regarding management conditions and policies.

NGK makes best efforts to promote constructive dialogue through sincere responses to requests for interviews with shareholders and investors, questions raised at general shareholder meetings, and inquiries sent through NGK's website. These responses are facilitated under the guidance of the directors in charge of the Finance and General Affairs departments, which work in close cooperation with the Corporate Strategy Office, the Corporate Communications Department, and the Legal Department when necessary.

NGK also places importance on direct dialogue with institutional investors, conducting biannual earnings presentations and overseas IR road shows led by senior management.

As for dialogue with individual investors, we took part in an IR event organized by the Nikkei Inc. newspaper company.

The details of these dialogues are regularly reported to the Board of Directors. This management feedback is used to improve management efficiency and transparency.

Shareholder and investor dialogues are conducted with the objective of increasing corporate value and capital efficiency, as well as promoting sustainable growth. The disclosure of material information not already publicly available within the context of these dialogues constitutes damage to the equality between shareholders. In principle, NGK does not disclose unannounced material information.

Disclosure of Corporate Information

We will release, in an accurate and timely manner, any information sought by the public; including information on our management, finance, products, and services to improve transparency in management and to gain society's trust in NGK Group companies.

Behavioral Guidelines

- We will promptly disclose any information required by society in accordance with applicable laws, regulations, and our internal rules.
- We will establish and adequately operate a mechanism for internal control relating to financial reports to disclose accurate financial information.
- We will make a good faith effort to answer any inquiry from customers pertaining to our products and services, providing responses in an appropriate manner.

Reference
URL

NGK Group Guidelines for Corporate Behavior
<https://www.ngk-insulators.com/en/info/governance/index.html>

Open Shareholder Meetings

NGK endeavors to hold open shareholder meetings that its shareholders feel welcome to attend. Every year, we introduce NGK corporate activities at the shareholder meeting with booths displaying product exhibits explained by NGK staff.

We also make efforts toward expanding shareholder meeting-related information, including the following:

(1) Mailing a convocation notice well in advance	Sent 22 days prior to the meeting date.
(2) Disclosing information on the website well in advance	Announced four days before convocation notices are sent out (since fiscal 2018).
(3) Taking part in the Tokyo Stock Exchange (TSE) Electronic Voting Platform*	Online voting system made available.
(4) Posting shareholder meeting documents on the website	Documents such as convocation notices, the results of vote execution, notices of resolution, and extraordinary reports are disclosed on the website. <div style="background-color: #006633; color: white; padding: 5px; border-radius: 10px; display: inline-block;"> General Meeting of Shareholders-related information https://www.ngk-insulators.com/en/ir/meeting/index.html </div>

*TSE Electronic Voting Platform: An electronic voting system operated by TSE. It allows people to vote not only through the conventional printed materials but also via the Internet, making the process more convenient for shareholders in Japan and overseas.

Two-Way Communication

In addition to regular presentations held in Japan and overseas, the NGK Group conducts one-on-one meetings and participates in interviews among other ongoing initiatives to expand dialogues with institutional investors. NGK senior management also visits and conducts one-on-one discussions with institutional investors in Japan and overseas.

Activities in Fiscal 2017

Activities	Details
Japan	Senior management conducted presentations for analysts and institutional investors twice this year. They also conducted one-on-one meetings and participated in interviews.
Overseas	Senior management conducted overseas IR meetings targeting analysts and institutional investors twice this year.
Online IR Library	Included financial reporting information, the timely disclosure of non-financial reporting information, securities reports, annual reports, General Meeting of Shareholder materials, and other information.

Reference
URL

Investor Relations

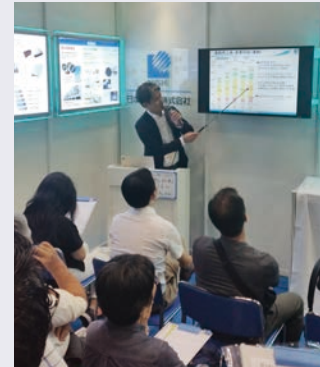
<https://www.ngk-insulators.com/en/ir/index.html>

TOPIC

Participation in Individual Investor IR and Investment Fair

The Nikkei IR and Investment Fair (organized by Nikkei Inc.) was held at the Tokyo Big Sight exhibition center in August 2017.

This event attracted over 100 corporate groups who set up booths during the two-day event that drew around 17,000 individual investors. The NGK booth received around 500 visitors, to whom we provided an explanation of what NGK does and of its potential for growth. Through this sort of direct dialogue, we were able to provide investors with a better understanding of, and stimulate greater interest in, what we do.



Measures for Returning Profits to Shareholders

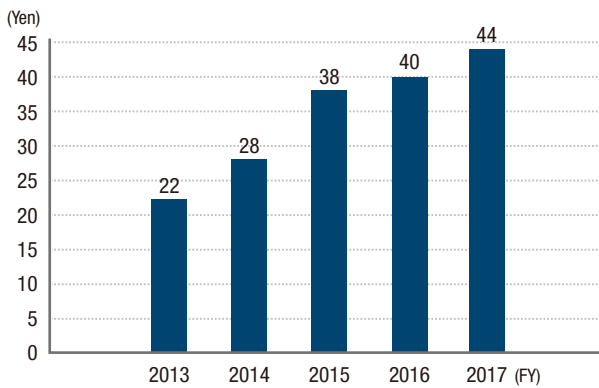
At NGK, returning profits to shareholders is considered one of the highest management priorities.

As a basic policy, we aim for management that focuses on shareholders and ROE. Based on this basic policy, we share profits while comprehensively taking account of our business performance, financial structure, and future business development. Our medium-term benchmark for the consolidated payout ratio is around 30%.

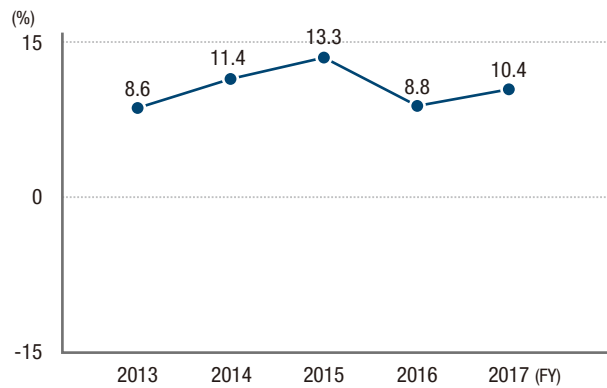
In fiscal 2017, we increased the annual dividend by 4 yen to 44 yen per share. The consolidated payout ratio stood at 30.9%.

We will keep striving to secure profitability above the capital cost and to maintain financial soundness. We opt to proactively return profits to our shareholders from the medium- to long-term perspective.

Dividends per Share



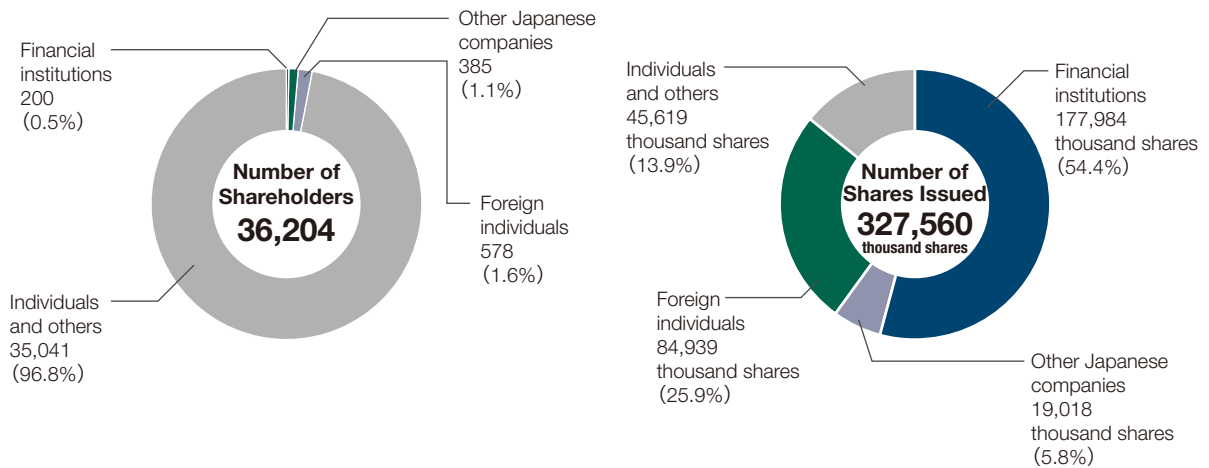
Return on Equity (ROE)



Shareholder Information

Stock Information (as of March 31, 2018)

Total number of shares authorized	735,030,000
Total number of shares issued	327,560,196
Number of shareholders	36,204



Major Shareholders (as of March 31, 2018)

Name of shareholder	Number of shares held (1,000 shares)	Shareholding ratio (%)
The Master Trust Bank of Japan, Ltd. (Trust Account)	36,350	11.29
Japan Trustee Services Bank, Ltd. (Trust Account)	24,261	7.54
The Dai-ichi Life Insurance Company, Limited	21,457	6.66
Meiji Yasuda Life Insurance Company	18,695	5.81
Bank of Tokyo-Mitsubishi UFJ, Ltd.	10,292	3.19
JP Morgan Chase Bank 380055	6,071	1.88
National Mutual Insurance Federation of Agricultural Cooperatives	5,799	1.80
Japan Trustee Services Bank, Ltd. (Trust Account 5)	4,663	1.44
State Street Bank West Client – Treaty 505234	4,597	1.42
Aioi Nissay Dowa Insurance Co., Ltd.	4,387	1.36

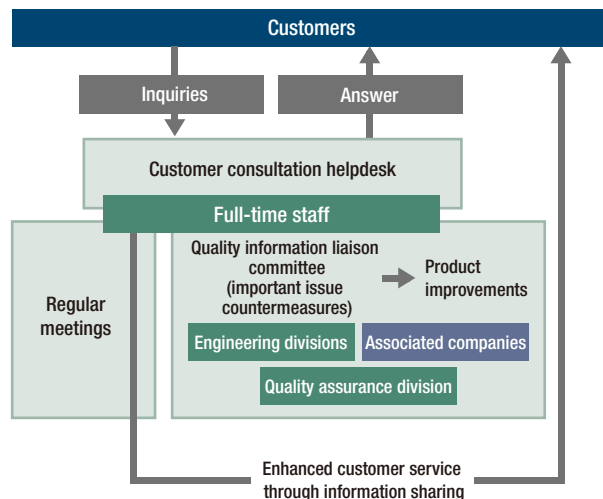
Note: The above list of major shareholders does not include NGK, which holds a total of 5,794 thousand treasury shares. The shareholding ratios above are calculated based on the number of shares derived by deducting the number of treasury shares (5,794,181) from the number of shares issued, and rounded down to two decimal places.

System for Making Use of Customer Feedback in Management

Establishment of a Customer Consultation Helpdesk

As the top industrial ceramics manufacturer in the industry, NGK makes use of its accumulated technologies to manufacture and sell C1 home-use water purifiers and promotes the creation of mechanisms for reflecting customer feedback.

We set up an C1 inquiry service for customers to create a mechanism for reflecting customer feedback in our products and services. During fiscal 2017, we received around 8,000 inquiries via phone and e-mail on various issues, including installation methods, product performance, requests for catalogs, and requests for repair and installation.



Customer Cards

We also respond to various customer feedback provided on customer cards sent from the customers who purchased the C1.

Information on the customer card is added to a list and then used to improve the service we provide for our customers, such as notifying them when it is time to replace the cartridge.



Dialogue with Employees

Distributing the Latest Information on CSR Activities on the CSR-Web

The CSR-Web was established on our intranet to introduce Group CSR initiatives with the intent of inculcating an awareness of CSR among all NGK domestic Group employees. In addition to sharing CSR topics with all employees and presenting objectives for each area, information on the site is regularly updated to include CSR Committee meeting discussions and, in principle, all Q&A between senior management and general employees who attend the CSR Talk Live event in an attempt to provide a wealth of content only available on this website.

In fiscal 2016, we started publishing a monthly Compliance Newsletter, introducing and explaining familiar themes with four-frame comics.



Reference
Page

Compliance Newsletter

P121

TOPIC

On-Site Visits by Management

As part of NGK's commitment to bottom-up management, President Oshima visits various sites—including headquarters departments, business units, sales offices, and production bases across the world—to engage in direct dialogue with employees.

In December 2017, President Oshima visited NGK Ceramics South Africa (ACS), and on the 11th he visited the Abu Dhabi office of the Power Business Group.

At ACS he met with managers from each department and listened intently and asked occasional questions as they provided him with activity reports. In Abu Dhabi he visited the under-construction NAS battery installation outside the city and strongly urged employees to do their best to push ahead despite the difficult environment.



CSR Talk Live (Dialogue with Employees Aimed at Practicing CSR)

To deepen employees' understanding of CSR and its initiatives, the NGK Group conducts CSR Talk Live, a talk event facilitating direct discussion with senior management held at all domestic sites since 2009.

In fiscal 2017, a total of 10 events were held at six locations, including Group companies, and were attended by around 420 employees. At the Talk Live event, the Senior Vice President and the CSR Committee Chair talked about CSR initiatives by the NGK Group, stressing the importance of CSR. Then, representatives from the Environmental Management Department and the CSR Promotion Office detailed the NGK Report 2017 (internal edition), using specific examples.

The employees who attended the event asked many questions and offered feedback on various initiatives, such as the environment, CSR, and helplines.

CSR Talk Live Events Held in FY2017 (location, date, no. of participants)

Site/group company	Date	Persons
Nagoya Site	December 7	46
	January 16	42
	January 25	50
NGK Ceramic Device Yamanashi	December 12	39
NGK Electronics Devices Yamaguchi	January 10	99
	January 11	
Chita Site	February 2	50
NGK Ceramic Device Komaki	February 6 (held twice)	59
Komaki Site	February 22	34



Cumulative total number of participants (2009–2017) **3,758**

CSR Talk Live Questions and Answers (Excerpt)

● Environment

Q Please tell us what specific initiatives are contained in the Five-Year Environmental Action Plan.

A Manufacturing line innovations, energy-saving kilns, ongoing improvement activities, utilization of heat insulating materials, waste heat regeneration burning, and other initiatives are being used to achieve environmental improvement alongside improved productivity and yields.

● Safety

Q Even with the installation of AEDs, we still do not understand how to use it. Would you agree that more training is needed?

A We agree completely. We will work with the relevant departments to have this training implemented.

● Corporate Governance

Q I feel that the UN Global Compact, SDGs, and biodiversity are of great importance; however, what can we as employees specifically do about them?

A Please keep following the Guidelines for Corporate Behavior. We realize that the current guidelines are not robust enough with regard to issues like human rights, and we will work on revising them. We are also recruiting volunteers to take part in biodiversity-related activities. We plan on promoting greater participation from employees.

Q What is there to stop the identities of employees contacting helplines from being revealed?

A Our number one priority is protecting the identities of those who contact helplines. No one must ever suffer negative repercussions for contacting a helpline. This is where the majority of our attention is being paid.

● CSR

Q How do the NGK Group's CSR activities compare in terms of personnel and cost to those of other, similarly-sized companies?

A Making a comparison based on human and financial resource commitments to CSR activities is difficult due to the fact that different companies have different approaches and different situations; however, we do make use of outside assessments to help us improve our CSR activities.

Communication Activities with Procurement Partners

Earnings Presentations for Suppliers

NGK held an earnings presentation meeting for major suppliers in June 2017, which was attended by 210 participants from 120 companies.

In the meeting, the director in charge of purchasing explained the company's plan to expand production and asked the suppliers for stronger ongoing support and cooperation. This was followed by the finance director's briefing on NGK's business results and an explanation by the purchasing director about NGK's systematic capital investment initiatives as well as activities to address procurement stability and supply chain CSR procurement-related issues.



Suppliers invited to the earnings presentation

Ongoing Operation of the Supplier Helpline

In 2008, NGK established the supplier helpline system. Receiving consultation via e-mail, fax, and telephone, we make an effort to respond with solutions quickly.

Reference
URL

Supplier Helpline

<https://www.ngk-insulators.com/en/info/procure/>

Visiting Individual Suppliers in Japan and Overseas

In order to ensure procurement from the most appropriate suppliers, NGK visits individual suppliers in Japan and overseas to conduct on-site audits, evaluating their QCD (quality, cost, and delivery) performance in a fair and equitable manner. In fiscal 2017, we visited a total of 111 suppliers: nine new suppliers and 102 existing suppliers.

Following the visit, we explained audit results to each company, and asked them to conduct improvement measures in underperforming areas. Through these activities, we strive to strengthen our QCD management system as well as to communicate with our suppliers to forge a relationship of mutual trust.

Corporate Governance

NGK is conducting measures to expand and strengthen its corporate governance to increase corporate value with the intent of becoming a company trusted by all its stakeholders.

Reference
URL

Corporate Governance Report

https://www.ngk-insulators.com/en/resource/pdf/sustainability/governance_en_201807.pdf

Basic Policies

Guidelines for Corporate Behavior and Thorough Observance of Behavioral Guidelines

To ensure appropriate operations and transparent management, NGK has set its sights on establishing and maintaining an organization capable of swiftly responding to changes in the business environment, and a fair and open management system emphasizing the interests of shareholders. These components make up NGK's basic approach to corporate governance.

To put this approach into practice, NGK has chosen a corporate governance structure anchored by an Audit & Supervisory Board. In addition to the General Meeting of Shareholders, the Board of Directors, and the Audit & Supervisory Board, NGK corporate governance includes the Executive Committee and several other committees established to assist the president in management decision-making. These bodies help to enhance governance efficacy by deliberating and reviewing important matters.

In recognition of needs to execute swift and optimal decision making and respond promptly to changes in the operating environment, NGK introduced an executive officer system, thus separating the management decision-making and supervision functions from business execution functions, and clearly defining the responsibilities of both.

Furthermore, to strengthen the supervision and monitoring functions of the Board of Directors, major committees among those tasked with mitigating the various risks surrounding NGK are obligated to report to the Board of Directors. NGK has also established a committee scheme, including a Nomination and Compensation Advisory Committee, a Corporate Council, a Conference of Outside Directors and Outside Audit & Supervisory Board Members, and a Business Ethics Committee to ensure the effectiveness of the Corporate Governance Code.

NGK will continue working toward developing a more comprehensive corporate governance scheme.

Corporate Governance Enhancement

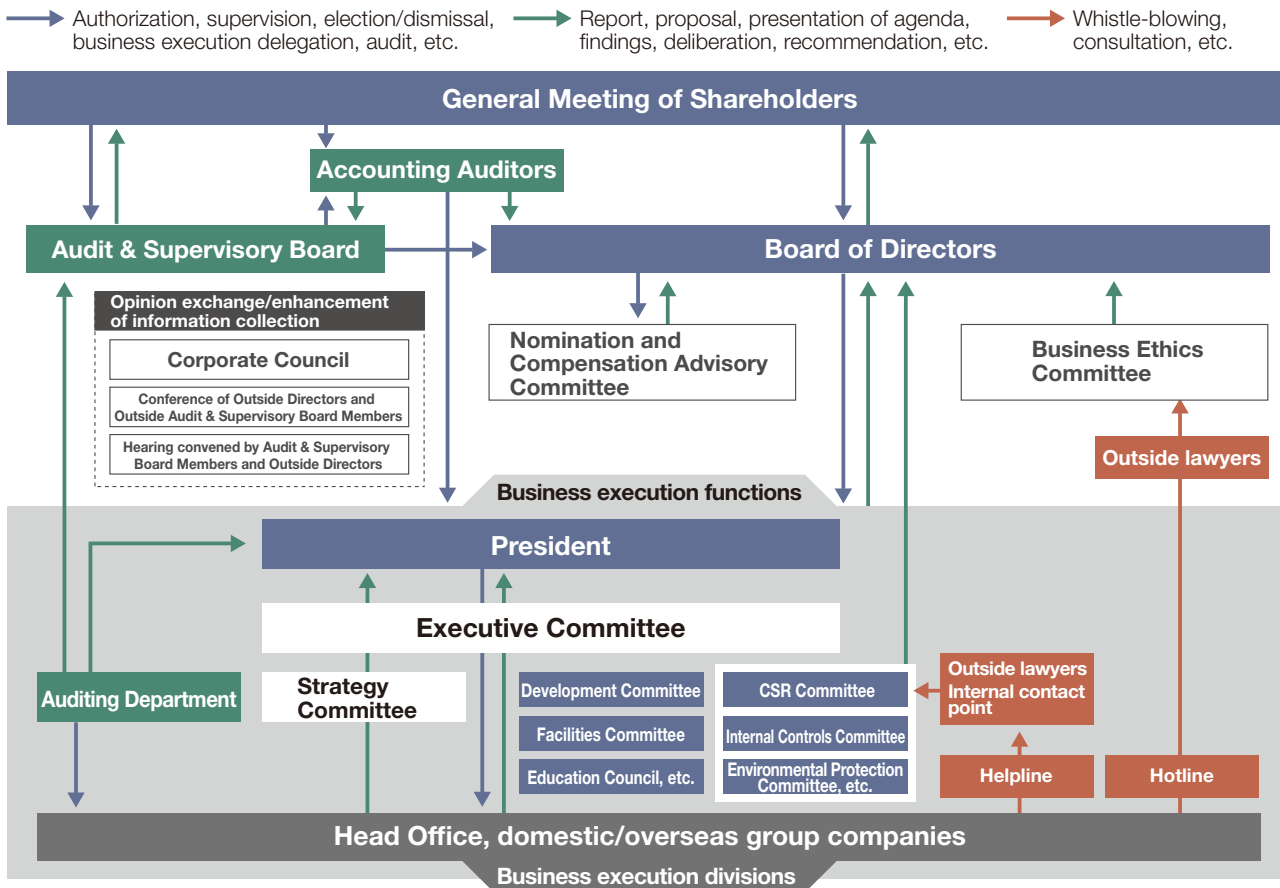
Ongoing structural enhancements aimed at strengthening corporate governance include the introduction of an executive officer system and an outside director system to improve the management supervision and monitoring functions and facilitate recommendations with respect to overall management.

April 1999	Formulated Guidelines for Corporate Behavior
April 2003	Revised NGK Group Guidelines for Corporate Behavior
June 2005	Introduced an executive officer system
	Introduced a stock option
	Introduced an outside director system
July 2005	Established the CSR Committee
April 2007	Established the CSR Office

June 2010	Appointed independent directors
July 2011	Major revision to NGK Group Guidelines for Corporate Behavior
April 2015	Signed on to UN Global Compact
June 2015	Established the Global Compliance Office
December 2015	Established committees for corporate governance
June 2017	Appointed one additional outside director

Corporate Governance Structure Scheme

To ensure lawful business activities and management transparency, respond quickly to changes in the management environment, and create and maintain a fair management system from the shareholder's perspective, NGK has created the following systems.



Committees on Corporate Governance

NGK has further strengthened and enhanced its corporate governance structures by establishing committees to bolster the supervision and monitoring functions of the Board of Directors.

Board of Directors

The Board of Directors deliberates matters prescribed in the Companies Act, as well as other important management issues, providing oversight for the execution of duties by directors. The Board of Directors includes three outside directors to create a system enabling management monitoring based on professional knowledge and decision-making from a wider perspective. As of June 26, 2018, the current Board of Directors comprises 12 members (11 men and one woman).

Audit & Supervisory Board

The Audit & Supervisory Board consists of four members, each of whom attends Board of Directors meetings and conducts other activities to audit the execution of duties by directors. The Audit & Supervisory Board includes two external members, each possessing significant business experience and extensive insight. The Audit & Supervisory Board members, including these highly independent outside members, conduct audits on the execution of duties by directors, business operations, and the company's financial position.

Executive Committee

Comprising the president, directors, Audit & Supervisory Board members, and executive officers and division heads designated by the president, this body deliberates the matters necessary to help the president with decision-making. As of June 26, 2018, the current Executive Committee comprises 16 members (15 men and one woman).

Business Ethics Committee

Comprised of outside directors and one internal director responsible for compliance, this committee monitors for fraud or illegalities involving senior management, as well as for compliance with the Competition Law and the Foreign Corrupt Practices Act, and reports directly to the Board of Directors. As a mechanism to prevent fraud or legal violations, in addition to the Helpline, an internal reporting system (Hotline) linked directly to outside lawyers was established with the aim of strengthening NGK's compliance structure.

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Internal Reporting System (Hotline)

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Corporate Council

The meeting enables outside directors to exchange opinions with representative directors and others when proactive recommendations for senior management are sought from outside directors regarding various management-related issues.

Conference of Outside Directors and Outside Audit & Supervisory Board Members

Comprised exclusively of outside directors, these meetings facilitate an exchange of opinions regarding NGK management issues, with the intent of proactively contributing to discussions at Board of Directors meetings.

Hearing convened by Audit & Supervisory Board Members and Outside Directors

Comprised of Audit & Supervisory Board members and outside directors, these hearings gather information from internal sources regarding the business environment and issues surrounding NGK.

Nomination and Compensation Advisory Committee

Comprised a majority of outside directors (total of 8, three outside directors, two outside audit & supervisory board members, and three internal directors), this committee attempts to ensure fairness and increase transparency related to determining the appointment and remuneration of board members and officers by deliberating matters related to the appointment and remuneration of board members and executive officers, Chief Executive Officer succession planning, and other matters, the results of which are reported to the Board of Directors.

Bodies Concerning Observance of Laws, Regulations, and Corporate Ethics

Internal Controls Committee	<p>This body deliberates matters necessary to help the president and Internal Controls Committee Chair with decision-making regarding internal controls system assessment and reporting related to financial reporting based on the Financial Instruments and Exchange Act.</p> <ol style="list-style-type: none"> 1. Determines the scope of reporting for each fiscal year, assessment and reporting schedules, standards to assess internal controls, and other basic matters 2. Summarizes internal controls assessment and drafts internal controls report
CSR Committee	<p>This body assists the president and CSR Committee Chair with decision-making by deliberating matters necessary for the observance of laws, regulations, and corporate ethics.</p> <p>Observance of Laws, Regulations, and Corporate Ethics</p> <ol style="list-style-type: none"> 1. Determination and revision or abolition of basic policies related to the observance of laws, regulations, and corporate ethics, including the NGK Group Guidelines for Corporate Behavior 2. Determination of systems, structures, and strict observance of important activities pertaining to laws, regulations, and corporate ethics company-wide 3. Determination, revision, or abolition of risk management structures pertaining to laws, regulations, and corporate ethics. <p>Additionally, responses to items determined to pose a significant threat to the company among other matters, incidents or accidents related to laws, regulations or corporate ethics, as well as consideration and evaluation of the projects promoted by each subcommittee and other CSR-related items identified as important by the CSR Committee Chair, are also deliberated.</p>
Environmental Protection Committee	<p>This body formulates and deliberates the planning of matters necessary to help the president and the Environmental Protection Committee Chair with decision-making regarding the realization of our Core Policy on the Environment to promote business activities in harmony with the environment.</p>
Quality Committee	<p>Aiming to increase customer satisfaction and trust by realizing even higher-quality products and services, this body deliberates the matters necessary to help the president and the Quality Committee Chair with decision-making regarding the following items.</p> <ol style="list-style-type: none"> 1. Determination and revision or abolition of Quality Policy and Objectives 2. Items pertaining to the prevention of serious quality defects in the market and technological responses after occurrence 3. Other quality-related matters determined to be important
Safety and Health Committee	<p>This body deliberates important issues on safety and health to assist the decision-making of the president and Safety and Health Committee Chair regarding the establishment of basic policies and priority targets pertaining to safety and health and the confirmation of labor accidents and priority activities.</p>
Development Committee	<p>This body deliberates items necessary to assist the decision-making of the president and Development Committee Chair regarding policies, evaluations, budgets, major individual planning, and commercialization projects related to development.</p>
Facilities Committee	<p>This body deliberates items necessary to assist the decision-making of the president and Facilities Committee Chair regarding the examination and evaluation of policies, budgets, performance, and major individual planning related to capital expenditure and information systems.</p>
Education Council	<p>This body deliberates items necessary to assist the president's decision-making regarding policies, systems, structures, and major promotion programs related to human resource development.</p>
BCP Countermeasures Headquarters	<p>Aimed at ensuring business continuity in times of emergency, this body executes the operation and maintenance of business continuity planning (BCP) in normal times as well as gives instructions on and support to restoration systems, and prioritizes restoration orders when BCP is in effect.</p>
Central Disaster Prevention and Control Headquarters	<p>This body executes requisite duties under commands from the Head and deliberates items necessary to assist the decision-making of the president and Head of this body regarding items related to earthquakes, storm and flood damage, fires, and explosions that threaten or significantly impact the company.</p>
Security Export Control/ Specified Export and Customs Clearance Control Committee	<p>This body deliberates and determines items necessary for guidance for subsidiaries and affiliates, legal compliance and the improvement of other internal systems with respect to security export controls, specified export declaration systems, and the management of customs clearance operations.</p>

Business Execution Status

Regarding business execution based on the Board of Directors resolutions, the president presides over company business as the chief executive of business execution. The Executive Committee holds discussions to assist the president's decision-making with respect to important matters regarding business execution. In addition, the Board of Directors is asked for proactive recommendations for management by outside directors pertaining to management-related issues at the Corporate Council, which facilitates an exchange of opinions between outside directors and representative directors.

Monitoring Status

In line with audit policies and plans defined by the Audit & Supervisory Board, Audit & Supervisory Board members make an effort to collect information through hearings convened by Audit & Supervisory Board members and outside directors, in an attempt to communicate with directors and employees while monitoring director business execution by attending Board of Directors and Executive Committee meetings. At Audit & Supervisory Board meetings attended by outside Audit & Supervisory Board members, the members exchange information with accounting auditors and the Internal Auditing Department in an attempt to facilitate mutual cooperation.

Election of Board Members, Executive Officers, and Audit & Supervisory Board Members

With respect to the nomination of candidates for the Board of Directors and Audit & Supervisory Board, all representative directors discuss matters related to each candidate. The Nomination and Compensation Advisory Committee, of which external directors make up a majority, then deliberates matters related to each candidate, and reports the results to the Board of Directors. As for candidates for the Audit & Supervisory Board, approval is obtained from the Audit & Supervisory Board in order to secure the independence of Audit & Supervisory Board members. With consideration given to the report made by the Nomination and Compensation Advisory Committee, candidates for the Board of Directors and Audit & Supervisory Board are determined by resolution of the Board of Directors and their confirmation is set as an agenda item for the General Meeting of Shareholders. Members of the Board of Directors and Audit & Supervisory Board are then appointed by resolution of the General Meeting of Shareholders. Also, to further clarify the directors' mission and responsibilities, the term of office for directors is one year.

Training Policies for Executives

Newly appointed directors and executive officers are provided with training conducted by attorneys practicing in the United States and Japan related to the Companies Act and the Competition Law, conducted at the time of their appointment. In addition, each year lectures are held, targeting all directors and executive officers, related to compliance with the Competition Law, focused on the expanding scope of Competition Law enforcement and practical business risks. In addition, with regard to outside directors, we provide regular opportunities for the provision of individual explanations by personnel from relevant business divisions concerning mainly proposals presented to the Board of Directors meeting as well as information and exchange of opinions pertaining to business environment and related issues.

Reference
Page

Policies on Training

P117

Board of Directors, Audit & Supervisory Board, Executive Officers



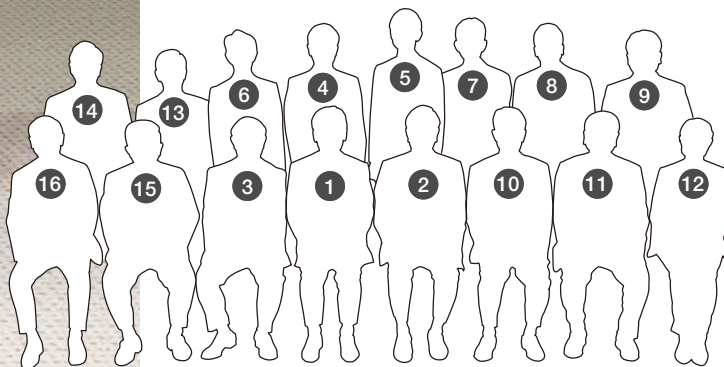
Board of Directors

- 1 **Taku Oshima**
President
- 2 **Yukihisa Takeuchi**
Executive Vice President
Group Executive, Corporate R&D; Development Committee Chair
- 3 **Hiroshi Kanie**
Executive Vice President
Responsible for Corporate Planning Office, New Business Planning Office, Secretarial Office, Corporate Communications Dept., Human Resources Dept., General Affairs Dept., and Power Business Group; Senior Officer in Charge of Group Companies; General Manager, Osaka Branch; in charge of overall personal information management, privacy protection, and Construction Business Act compliance
- 4 **Susumu Sakabe**
Director and Senior Vice President
Responsible for Finance Dept. and Purchasing Dept.; General Manager, Tokyo Main Office
- 5 **Ryohei Iwasaki**
Director and Senior Vice President
Group Executive, Process Technology Business Group; in charge of management affairs
- 6 **Chiaki Niwa**
Director and Senior Vice President
Group Executive, Corporate Manufacturing Engineering; responsible for Quality Management Dept., Environmental Management Dept., and Safety and Health Management Dept.; Chair of Facilities Committee, Quality Committee, Environmental Protection Committee, and Safety and Health Committee

- 7 **Shuhei Ishikawa**
Director and Senior Vice President
Group Executive, Electronics Business Group; General Manager, Electronic Components Div., Electronics Business Group
- 8 **Nobumitsu Saji**
Director and Senior Vice President
Responsible for Auditing Dept., Group Compliance Dept., Legal Dept., and Intellectual Property Dept.; Chair of CSR Committee and Internal Controls Committee; in charge of company-wide Competition Law compliance; Data Protection Officer
- 9 **Atsushi Matsuda**
Director and Senior Vice President
Group Executive, Ceramic Products Business Group; General Manager, Nagoya Site
- 10 **Hiroyuki Kamano**
Outside Director
- 11 **Toshio Nakamura**
Outside Director
- 12 **Emiko Hamada**
Outside Director

Audit & Supervisory Board

- 13 **Takeyuki Mizuno**
Audit & Supervisory Board Member
- 14 **Ken Sugiyama**
Audit & Supervisory Board Member
- 15 **Setsuo Tanaka**
Audit & Supervisory Board Member, Outside
- 16 **Junichi Itoh**
Audit & Supervisory Board Member, Outside



Executive Officers



Shigeru Kobayashi
Senior Vice President
Group Executive,
Power Business Group;
General Manager,
Komaki Site



Hiroshi Kurachi
Senior Vice President
General Manager,
Engineering Div.; General
Manager, Sensor Div.;
Ceramic Products
Business Group



Takaya Teshima
Senior Vice President
Group Vice Executive,
Process Technology
Business Group;
General Manager,
Chita Site



Hiroto Matsuda
Senior Vice President
General Manager,
Manufacturing Div.,
Ceramic Products
Business Group



Hiroyuki Tsuji
Vice President
Chief Technical Officer,
Electronics Business
Group (in charge of
technology/new product
promotion projects)



Tomohiro Yamada
Vice President
President, NGK
Electronics Devices Inc.



Tadaaki Yamada
Vice President
General Manager,
Human Resources
Dept.; in charge of
General Affairs Dept.



Akira Kato
Vice President
General Manager, New
Metals Div., Electronics
Business Group



Tsutomu Nanataki
Vice President
Group Vice Executive,
Corporate R&D; Project
Leader, Functional
Materials Development
Project, Corporate R&D



Masanobu Inoue
Vice President
General Manager,
Industrial Process Div.,
Process Technology
Business Group



Hiroharu Kato
Vice President
General Manager,
Worldwide Sales &
Marketing Div., Ceramic
Products Business Group;
President, NGK Europe
GmbH



Atsushi Miyajima
Vice President
General Manager,
Manufacturing
Engineering Div.,
Corporate Manufacturing
Engineering Group



Hideaki Shindo
Vice President
General Manager,
Finance Dept.

Outside Directors and Outside Audit & Supervisory Board Members

NGK appoints individuals who possess outstanding achievements and a wealth of experience from a variety of industries to monitor director business execution in an attempt to realize stronger, more efficient management. Additionally, in terms of outside director independence, overall determinations are made with consideration for the Tokyo Stock Exchange “Guidelines for Listing” to avoid conflicts of interest with general shareholders. Our three outside directors are professionals able to make objective, rational decisions, while our two outside Audit & Supervisory Board members provide opinions mainly from social and financial perspectives.

Activities of Outside Directors and Outside Audit & Supervisory Board Members (fiscal 2017)

	Name	Attendance at Board of Directors meetings	Main activities
Outside Directors	Hiroyuki Kamano	Attended 15 out of the 15 meetings held.	Mr. Kamano provides opinions regarding compliance structure enhancement and management approaches for management planning, utilizing his substantial experience and specialization as an attorney.
	Toshio Nakamura	Attended 15 out of the 15 meetings held.	Mr. Nakamura provides opinions that clarify the foundation of business decisions, utilizing his wide-ranging experience and achievements in economic and industrial administration.
	Emiko Hamada	Attended 11 out of the 15 meetings held. Attended all 11 Board of Directors meetings held from when she assumed office as Director until the last day of the previous fiscal year.	Ms. Hamada provides opinions on strengthening technological capabilities, product development, and product commercialization, utilizing her experience from engaging in business development and extensive knowledge concerning research and development.

	Name	Attendance at Board of Directors meetings	Attendance at Audit & Supervisory Board meetings	Main activities
Outside Audit & Supervisory Board Members	Setsuo Tanaka	Attended 14 out of the 15 meetings held.	Attended 14 out of the 14 meetings held.	Mr. Tanaka provides opinions on practical responses and strengthening measures concerning the risk management system, utilizing his experience and achievements in police administration.
	Ichiro Terato	Attended 15 out of the 15 meetings held.	Attended 14 out of the 14 meetings held.	Mr. Terato provides opinions on financial policies, utilizing his experience and wide-ranging knowledge gained in management positions with The Bank of Tokyo-Mitsubishi, Ltd. (now MUFG Bank, Ltd.) and Nikon Corporation.

Current Independent Directors and Reasons for Appointment (fiscal 2018)

	Reasons for appointment
Outside Director Hiroyuki Kamano	Having long engaged in legal practice as an attorney-at-law, Mr. Kumano possesses a wealth of experience and achievements in the legal community, including his service as Vice-President of the Tokyo Bar Association. Drawing on this experience, he has been fulfilling his duties as an outside director of the company by sharing opinions regarding the management strategy and strengthening of the compliance structure, as well as offering suggestions in connection with the company's business operation and properly overseeing the management of the company. We have therefore elected him to the position of outside director.
Outside Director Toshio Nakamura	Having served as Director for the Trade Bureau of the Ministry of International Trade and Industry (former name of the Ministry of Economy, Trade and Industry), Director-General of the Small and Medium Enterprise Agency, and President of the Japan Chamber of Commerce and Industry, Mr. Nakamura has long been playing a vital role in the promotion of commerce and industry. By leveraging his knowledge and abundant experience cultivated over the course of his career, he has been appropriately fulfilling his duties as an outside director of the company by sharing his opinions on the importance of clarifying the basis for business decisions, as well as offering suggestions in connection with the company's business operation and overseeing the management of the company. We have therefore elected him to the position of outside director.
Outside Director Emiko Hamada	Ms. Hamada has made remarkable achievements, such as leading the invention and world-first commercialization of the CD-R (recordable CD) while working at Taiyo Yuden Co., Ltd. Since then, she has been engaged in research activities mainly based on industry-academia-government collaboration as Professor at the Nagoya Institute of Technology and Visiting Professor at Nagoya University. In her role as outside director she draws upon the insights which she has cultivated over the course of her career to offer recommendations about the management of corporate affairs, particularly from a technological capacity strengthening and product development and commercialization standpoint, and to provide appropriate administrative oversight. We have therefore elected her to the position of outside director.
Outside Audit & Supervisory Board Member Setsuo Tanaka	Mr. Tanaka has cultivated a wealth of experience and achievements over his career in government, which has spanned a variety of important posts within the National Police Agency prior to his current position as Commissioner General of the National Police Agency. Mr. Tanaka is able to leverage this experience to provide compliance and risk management-related recommendations regarding overall NGK operations. Based upon this demonstrated competency and capability, he has been selected as an outside audit and supervisory board member.
Outside Audit & Supervisory Board Member Junichi Ito	Mr. Ito has been involved with corporate management for many years, including as Senior Management Executive Officer for the Bank of Tokyo-Mitsubishi UFJ, Ltd. (now MUFG Bank, Ltd.) and Representative Director, Senior Executive Vice President and CFO for Nikon Corporation. As an expert in corporate management, Mr. Ito is able to leverage the wealth of experience and the insights he has cultivated over his long career to provide appropriate advice and oversight aimed at strengthening NGK's corporate governance. Based upon this demonstrated competency and capability, he has been selected as an outside audit and supervisory board member.

Remuneration of Directors and Audit & Supervisory Board Members

Policies for Determining Remuneration, etc. of Directors and Audit & Supervisory Board Members

With the aim of incentivizing the realization of NGK's corporate philosophy and management policies, as well as to heighten the transparency, fairness, and clarity of their responsibilities, the remuneration of NGK directors is comprised of three components:

1. A position-based, fixed annual salary as basic remuneration,
2. An annual performance-based bonus to heighten the link with the company's performance and further clarify the fulfillment of responsibilities of each director, and
3. Stock-related remuneration designed to boost motivation and morale toward enhancing corporate value over the medium- to long-term through sound company management by having them share with shareholders the risk of stock price decline as well as the rewards of stock price increases and increasing their sensitivity to NGK's share prices.

In terms of the ratio of fixed annual remuneration to variable remuneration, from the perspective of emphasis on maintaining and improving performance over the medium- to long-term, NGK sets the performance-based variable remuneration at an appropriate level.

For the purpose of ensuring fairness and increasing transparency during the process of determining remuneration, the Nomination and Compensation Advisory Committee comprising a majority of outside directors deliberates matters related to the policies for determining remuneration, proposals on the total amount of remuneration for directors and Audit & Supervisory Board members, and proposals on the amount of remuneration for individual directors and executive officers, the results of which are reported to the Board of Directors.

Outside directors and Audit & Supervisory Board members receive only basic remuneration based on their supervision of management from an independent perspective and role as monitors.

Reference
Page

Policies and Procedures for Determining Remuneration of Senior Management and Directors by the Board of Directors P114

Remuneration of Directors and Audit & Supervisory Board Members (fiscal 2017)

Director category	Total remuneration (million yen)	Total remuneration by type (million yen)				Applicable directors (people)
		Basic remuneration	Stock options	Bonus	Retirement benefits	
Directors (excluding Outside Directors)	676	428	65	182	–	10
Audit & Supervisory Board Members (excluding Outside Audit & Supervisory Board Members)	61	61	–	–	–	2
Outside Directors and Outside Audit & Supervisory Board Members	62	62	–	–	–	5

Directors Receiving Total Remuneration of ¥100 Million or More

Name	Director category	Total remuneration by type (million yen)				Total remuneration (million yen)
		Basic remuneration	Stock options	Bonus	Retirement benefits	
Taku Oshima	Director	68	11	47	–	127

Comments from Outside Directors



Hiroyuki Kamano

Outside Director

April 1971	Joins Ministry of Foreign Affairs
April 1981	Becomes registered attorney
October 1988	Becomes representative attorney of Kamano Sogo Law Offices (present position)
June 2007	Appointed as Outside Auditor of Komatsu Ltd.
July 2007	Appointed as Outside Director of Sumitomo Life Insurance Company
April 2009	Appointed as Vice President of Tokyo Bar Association
June 2011	Appointed as Director of NGK (present position)
June 2015	Appointed as Outside Auditor of House Foods Group Inc. (present position)

Three lines of defense to ensure more thorough compliance

For NGK, strict compliance is an essential business creed, and President Oshima is in the vanguard promoting awareness of it. Systems are in place to ensure that accidents or problems, even at overseas plants, are reported to top management immediately, as well as to the Board of Directors. I view this as compliance-minded business operation.

And yet an incident involving a delivery test discrepancy occurred recently. This unfortunately shows that a gap yet remains with regard to compliance-mindedness between top management and those on-site. Having said that, however, in a large organization, gaps in awareness are inevitable and preventing such incidents will require preventive systems be put in place in addition to awareness-raising efforts. In the case of delivery tests, we are separating the inspection department from the business division; however, the construction of this sort of system is the responsibility of management. Also, I feel that improving the awareness gap that exists between management and those on-site will require further personnel exchange and interaction between business divisions within Japan and overseas.

In addition, there are three lines of defense that are essential to ensuring strict compliance within a company whose operation is becoming increasingly globalized. The first line is the compliance activities undertaken on-site; the second is the support system comprised of the legal department, finance department, quality control department, and other functional departments working together across borders; and the third is internal auditing performed by the auditing department. A single mistake in compliance can be all that is needed to upend the management of a company. If you are not strict about compliance, it will end up costing you a lot more than if you were. I believe the issue of how to efficiently maintain the three lines of defense while finding ways of further raising on-site awareness is a challenge for management to address and the Board of Directors to verify.



Toshio Nakamura

Outside Director

April 1970	Joins Ministry of International Trade and Industry (now Ministry of Economy, Trade and Industry)
June 1998	Appointed as Director for Policy Coordination of Minister's Secretariat
June 2000	Appointed as Director-General of Small and Medium Enterprise Agency
November 2007	Appointed as President of Japan Chamber of Commerce and Industry, and Tokyo Chamber of Commerce and Industry
June 2011	Appointed as Director of NGK (present position)
March 2016	Appointed as Chairman of National Association of Trade Promotion for Small and Medium Enterprises (present position)
May 2016	Appointed as Outside Director of Aoki Super Co., Ltd. (present position)
June 2016	Appointed as Outside Director of SMK Corporation (present position)

Concentrating on robust communication and improved decision-making

This is my seventh term as Outside Director, and over that time I have developed a strong understanding of NGK's operations and business practices and have brought an outside viewpoint to meetings of the Board of Directors to ensure more robust discussion. Following every meeting of the Board of Directors, I talk with representatives from each division to hear their opinions as well as offer my own.

The larger an organization becomes, the greater the need for internal and external communication. When the divisions and departments within a company do not communicate with one another about what challenges exist, how company policies are working, etc., they will become insular and cut off from one another. It is not uncommon to find that the seeds* of new business, as well as possibilities for technologies that employees have, are to be found outside of a given business division's immediate domain. New awareness and perspectives gained from sharing experiences often leads to great leaps in business. I, too, endeavor to use the opportunity which the Board of Directors' meeting affords me to pursue more robust communication with those inside NGK.

What is also important, from the standpoint of corporate administration, is paying attention to the discussions and decision-making that take place prior to big decisions, as this makes it possible to perform reviews and verification after the fact. By ensuring that the points of discussion, and the arguments made surrounding those points, are recorded in a manner which allows them to be explained later, they can be reviewed to see whether something was forgotten or unanticipated or whether the risk decisions made were appropriate. The results of this review can then be applied to the benefit of future decisions. Amidst increasing uncertainty about the future, performing reviews and verification after the fact is essential for improving the quality of decision-making, and within NGK and elsewhere people are becoming increasingly accountability-conscious. As for myself, I see my role as providing ongoing input and feedback to ensure the thoroughness of this process.

*Technologies and know-how that can lead to the development of new business and products.



Emiko Hamada

Outside Director

April 1984	Joins Taiyo Yuden Co., Ltd.
December 2001	Appointed as General Manager, Quality Assurance Control R Technology Division, Engineering Group, Taiyo Yuden
September 2003	Appointed as Chief Engineer, Basic Research Division, General Research Laboratory, Engineering Group, Taiyo Yuden
November 2008	Appointed as Associate Professor, Center for Social Contribution and Collaboration, Nagoya Institute of Technology (NITech)
April 2011	Appointed as Professor, Center for Social Contribution and Collaboration, NITech, and Professor for Master of Techno-Business Administration, NITech Graduate School
April 2012	Appointed as Professor, Center for Research on Assistive Technology for Building a New Community, NITech
May 2015	Appointed as Third-Area Program Officer, A-STEP (Adaptable and Seamless Technology Transfer Program through Target-driven R&D), Japan Science and Technology Agency (present position)
July 2016	Appointed as Part-time Lecturer, NITech (present position)
August 2016	Appointed as Visiting Professor, Nagoya University (present position)
June 2017	Appointed as Director of NGK (present position)

Expectations for further growth in NGK technology

New products are not created in a year or two. They are the cumulative result of many years of research trial and error. It is from that perspective that I am quite impressed with the achievement in this financial period of the Challenge 30 initiative, as well as the road map for steady roll-out of new products in the coming financial periods.

Still, though, I feel that NGK's material development strengths could be showcased even better. While it is good that NGK maintains a serious and professional corporate culture, I feel it still has challenges to overcome in terms of communicating its appeal. By making changes in how it communicates information, in particular changing how it presents itself so as to increase outside interest, NGK can facilitate more open innovation, through which the potential value of NGK technology can surely be enhanced even further. At present, all of the innate potential of NGK's technology is not being utilized. More proactive efforts to communicate this information is needed.

During Board of Director meetings and new product briefings, I make sure to draw on the B2C experience I have accumulated to allow me to steer discussion around to what the appeal of a new product is from a customer's perspective. I also make a point of asking whether the components and technology of the product can be put to use in even broader applications that meet customer needs, and whether this can be developed into an entire business package rather than just parts supply.

All of this has an impact on the future of NGK's business portfolio. NGK's high profitability is due to a lack of competition and an extremely good market position. I believe that action is needed for the future which will increase the range of products NGK offers in order to build up its business portfolio, and I intend to keep having this discussion with the Board of Directors.

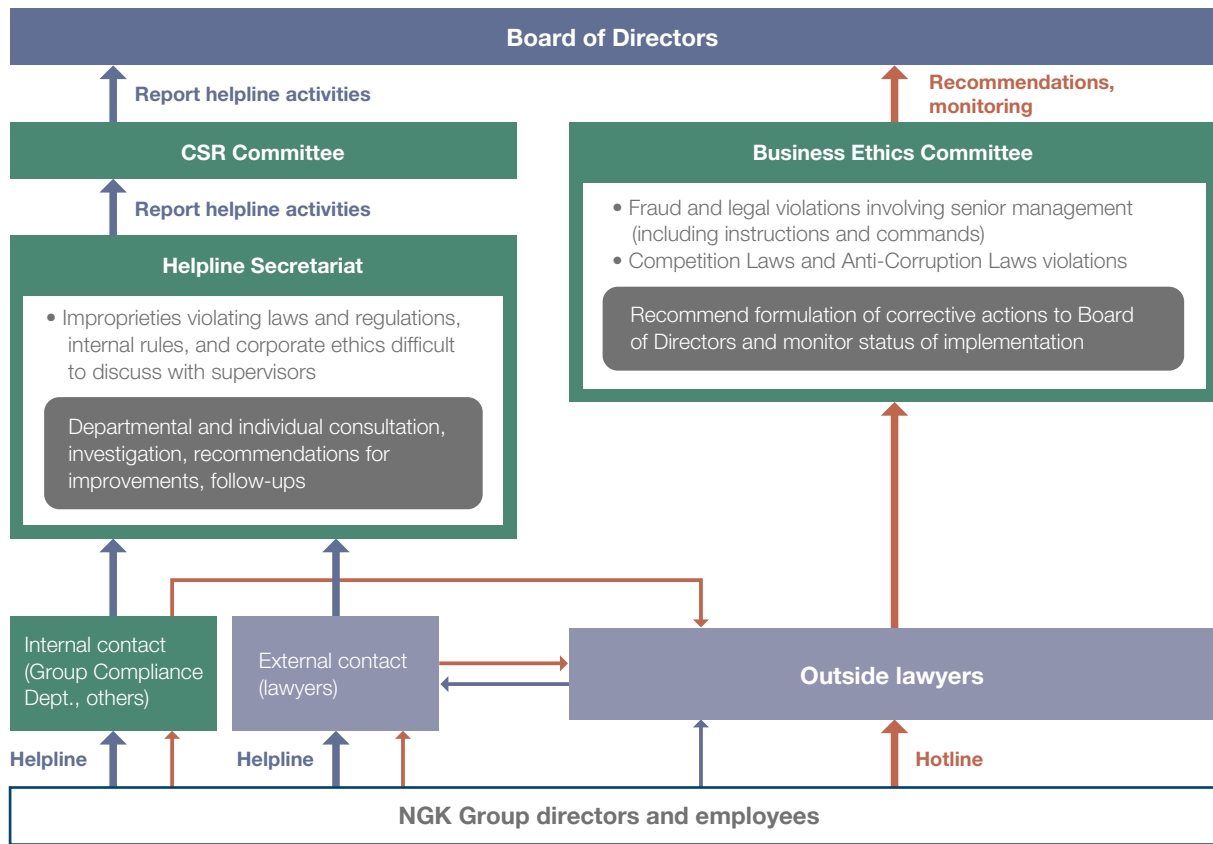
Whistle-Blowing System

Helpline

We have established a helpline to receive inquiries and reports from employees aimed at curtailing and preventing activities contrary to the spirit of the NGK Group Guidelines for Corporate Behavior and to facilitate the quick resolution when issues occur. Each overseas Group company has its own helpline. Those seeking advice or reporting issues are promised protection under corporate regulations. There were 43 consultation cases in fiscal 2017.

Hotline

We have established a hotline as an internal control system for responding to fraud and legal infractions committed by senior management, including Competition Laws and Anti-Corruption Laws violations. The hotline is operated by outside lawyers, with issues handled by the Business Ethics Committee, composed mainly of outside directors, who report directly to the Board of Directors. We have been pushing forward with the establishment of the hotline at overseas Group companies in light of the circumstances in each country.



Compliance Card

For thorough awareness of the whistle-blowing system, we created a carry-size Compliance Card and distributed it to all employees at NGK and all domestic Group companies.

コンプライアンスカード

NGKグループでは法令、社内規則、企業倫理に反する行為(コンプライアンス違反行為)を発見したり、被害されたり、自ら行ってしまった場合に相談・報告ができる窓口(ヘルプラインとホットライン)を設けています。

この窓口は、NGKおよびNGKグループ会社に勤務する方の方が安心して利用できるように運営されています。

- 相談・報告内容などの情報管理は徹底されています。
- 相談・報告者は、不利益を被ることの無いよう保護されます。

ヘルプライン・ホットラインの利用にあたって

- 相談・報告の得意に該当するが苦が特定がつかない場合でも、相談・報告することができます。
- 相談・報告は匿名が可能なですが、事情が有利な場合でも構いません。
- 相談・報告は必ず社内窓口と社外窓口があります。会社に対して完全な匿名を希望する場合は、社外窓口にご相談ください。
- 相談・報告事項について、調査の結果「修正・結果、罰金・決退、推薦・勧告」のいずれかの対応が決定した場合、相談・報告者に対してお知らせいたします。
- Note: メールを利用する場合、上記ヘルプライン設定をご覧ください。

2017年4月8日版

相談・報告内容と受理窓口

ホットライン対象事項は別のコンプライアンス記載またはそのおそれのある行為についての相談・報告を受ける窓口です。

※ 相談・報告は必ず社内窓口と社外窓口があります。

「サービス残業、不適切な経費処理、会社情報の漏洩」など

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052-872-4855	052-872-8768	ngk2@ngk.co.jp
052-872-8750	052-872-7837	ngc@ngk.co.jp
052-835-6266	052-835-5827	ngc@ngk.co.jp

※ 社内の営業窓口へ報告・相談をする場合は、必ず報告者の「報告」の欄に「社内」を記入してください。

※ 03-266-8860 ①に關しては利用 ②に關しては利用可 kengo.miyamoto@mlaw.jp

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Approaches to Observe the Corporate Governance Code

In accordance with the basic principles of the Corporate Governance Code mandated by the Tokyo Stock Exchange, NGK's implementation status is as follows: NGK implements all of the individual principles of Corporate Governance Code.

Disclosure Based on the Principles of the Japan's Corporate Governance Code

Principle 1-4. Policy on Cross-Shareholdings and Standards for Exercise of Voting Rights Pertaining to Cross-Shareholdings

NGK continuously holds shares of listed companies, which contribute to long-term business development, as cross-shareholdings, primarily in order to maintain and strengthen business relationships.

NGK holds the shares of Morimura Group, which was established by the same founders of NGK, to enhance the brand value of NGK Group. NGK Group companies will mutually work on the improvement of management quality and each company will contribute to the development of the industry focusing on ceramics.

At its Board of Directors' meeting, NGK determines the necessity of the continuous holding of shares as cross-shareholdings by regularly reviewing the significance of holding, stock prices, dividend yields, ratings, and so forth, and NGK gives specific explanations on the purpose and rationality of holding of shares as cross-shareholdings in its annual securities reports.

For voting rights pertaining to cross-shareholdings, NGK exercises voting rights focusing on factors including whether the content of proposals adversely affect the interest of shareholders and, from a medium- to long-term perspective, whether the investee company implements management that emphasizes the enhancement of corporate value and the interest of shareholders.

Principle 1-7. Framework of Procedures for Related Party Transactions

At NGK, transactions with directors and corporate officers are designated as matters to be approved by the Board of Directors in accordance with the procedures pertaining to conflict of interest transactions prescribed in laws and regulations. NGK deliberates and makes a resolution of said transactions, at its Board of Directors' meeting, in terms of whether or not the content and conditions of transactions are appropriate and do not impair NGK, and discloses the major content of transactions in its business reports and annual securities reports. Transactions with audit & supervisory board members and major shareholders that do not pose a conflict of interest prescribed in laws and regulations are also designated as matters to be approved at the Board of Directors' meeting, as well as disclosed as above.

Principle 3-1. Full Disclosure

1. Company objectives (management philosophy, etc.), management strategies, and management plans

NGK establishes the corporate philosophy "NGK products and technologies must create new value and contribute to the quality of life." Management strategies and management plans are disclosed in the financial results and on the NGK website.

2. Basic approach and basic policies on corporate governance

For the basic approach and basic policies on corporate governance, please refer to page 100 "Basic Policies" of this report. The basic policies on NGK's corporate governance code are as follows:

(1) Securing the rights and equality of shareholders

To effectively secure shareholders' rights including voting rights at a General Meeting of Shareholders, NGK complies with appropriate procedures pertaining to the exercise of voting rights by shareholders, and provides information that sufficiently explains to shareholders in both quality and quantity through timely and appropriate information disclosure.

Reference
Page

Basic Policies

P100

(2) Appropriate cooperation with stakeholders other than shareholders

Based on its corporate philosophy, NGK endeavors to ensure sustainable growth and create medium- to long-term corporate value by actively promoting appropriate cooperation with various stakeholders, including employees, customers, business partners, creditors, and local communities.

(3) Ensuring appropriate information disclosure and transparency

Recognizing that appropriate disclosure of information contributes to ensuring the transparency of corporate management as well as improving corporate governance, NGK actively provides not only financial information, such as financial conditions and operating results of NGK, but also non-financial information, such as information related to business strategies and business issues, risks, and corporate governance.

(4) Responsibilities of the Board of Directors, etc.

Based on recognition that the major responsibilities of the Board of Directors are to present the basic policy on management as well as supervision and monitoring of the performance of duties by directors, NGK will leverage the various committees pertaining to business execution and advisory committees that consist mainly of outside directors/audit & supervisory board members so that the Board of Directors can adequately fulfill their responsibilities.

(5) Dialogue with shareholders

Based on recognition that constructive dialogue with shareholders is important for the sustainable growth and the enhancement of medium- to long-term corporate value, NGK sincerely responds to dialogue requested by shareholders in cooperation with the relevant divisions as necessary, and works to provide the management with effective feedback on opinions and concerns of shareholders.

3. Disclosure of Policies for Determining the Amount or Calculation Method of Remuneration

Remuneration policies

The remuneration of directors (excluding outside directors) and corporate officers consists of the three components stated below in an aim to enhance motivation toward a realization of NGK's corporate philosophy and management policy, as well as to clarify the accountability of officers, and to increase fairness and transparency:

1. basic remuneration as fixed annual remuneration according to respective positions;
2. a performance-linked annual bonus that is linked more to the business performance so as to further clarify the accountability of each director; and
3. stock-related remuneration to enhance motivation and morale of directors to improve the medium- to long-term corporate value through appropriate corporate management by further increasing sensitivity toward the NGK stock price and sharing with shareholders both advantages and risks generated by ups and downs of the stock price.

With regard to the ratio between fixed annual remuneration and variable remuneration, the ratio of variable remuneration linked with performance is set so as not to be excessively higher than fixed remuneration from a perspective of putting priority on the stability and enhancement of medium- to long-term performance.

NGK does not pay any performance-linked bonus or stock-related remuneration to outside directors and audit & supervisory board members and only pays basic remuneration since they assume roles in supervising and auditing management from an independent standpoint.

By the resolutions at the General Meetings of Shareholders held in June 2007 and June 2017, NGK has set the maximum amount of remuneration, etc., excluding stock options, or stock-related remuneration of directors at ¥800 million per year, which includes the amount of ¥60 million per year for outside directors. It was also resolved that the maximum amount of remuneration, etc., concerning stock options to be allocated to directors (excluding outside directors) to be set at ¥200 million per year, and the maximum amount of remuneration, etc., of audit & supervisory board members at ¥100 million per year. Board members' remuneration, etc., was capped at 100 million yen per year.

Procedures for determination of remuneration

With regard to the remuneration of officers, NGK will endeavor to ensure fairness and enhance transparency by deliberating on basic policies and procedures for determination of remuneration, the overall remuneration range of directors/audit & supervisory board members, and the amount of remuneration for individual directors/audit & supervisory board members at the Nomination and Compensation Advisory Committee, comprised mainly of outside directors/audit & supervisory board members and reporting the results thereof to the Board of Directors. At the Board of Directors' meeting, matters relating to the remuneration of directors and executive officers will be resolved, compliant to the reporting procedures of the Committee, and the annual amounts of remuneration after the resolution, including bonuses stated in representative director contracts, will be determined. As specific procedures, NGK sets basic remuneration commensurate with managerial positions taking into account factors such as corporate performance and the remuneration levels of relevant industries. NGK determines the performance-linked bonus based on the results and changes of management indices, such as consolidated operating margin, consolidated net sales, and consolidated ROE for each fiscal year. With regard to stock-related remuneration, NGK grants stock compensation-type stock options as a long-term incentive. The exercise price of the stock option is ¥1 per share, and NGK determines the number of stock options according to the respective managerial positions. As terms and conditions of the exercise of rights, the director shall, in principle, exercise his/her rights within five years after the lapse of one year from the date of retirement from the office of officer. The amount of remuneration, etc., of each audit & supervisory board member is determined through consultation between the audit & supervisory board members.

4. Policies and procedures of the Board of Directors in appointing senior management and nominating the candidates for directors and audit & supervisory board members

Policies concerning nomination

NGK is engaged in the manufacturing business supplying raw materials such as ceramics and related products to diverse business domains and a wide range of areas including overseas. NGK's senior management, directors and corporate officers who assume business execution are required to make business judgments and decisions based on their respective profound knowledge in each business field, manufacturing technology, research and development as well as knowledge of finance, legal affairs, and labor affairs, and standing audit & supervisory board members are also required to conduct audit based on their expert knowledge in finance and knowledge obtained through individual business experience. Therefore, in nominating candidates, NGK places emphasis on practical business experience in manufacturing technology, research and development, sales, planning, etc., in each business field, and leadership, as well as on whether or not they have expertise, such as in finance, legal affairs, and labor affairs. With regard to outside directors and outside audit & supervisory board members, NGK selects candidates from among persons who have a high level of expertise in laws, corporate finance and others, as well as knowledge of international affairs and social and economic trends. The Articles of Incorporation of NGK stipulate that the prescribed number of directors shall not exceed fifteen. The above policies are deliberated at the Nomination and Compensation Advisory Committee, comprised mainly of outside directors/audit & supervisory board members, and results thereof are reported to the Board of Directors.

Procedures concerning nomination

With regard to the nomination of candidates for directors and audit & supervisory board members, all representative directors deliberate on each candidate, and to secure the independence of the candidates for audit & supervisory board members, all representative directors obtain approval from the Audit & Supervisory Board. In addition, to ensure fairness and transparency in the nomination process, each candidate is deliberated at the Nomination and Compensation Advisory Committee, and results thereof are reported to the Board of Directors. At the Board of Directors' meeting, candidates for directors and audit & supervisory board members are determined, compliant to the reporting procedures of the Committee, as an agenda (proposal) for the General Meeting of Shareholders.

5. Explanations regarding individual appointments and nominations in appointing senior management and nominating candidates for directors and audit & supervisory board members by the Board of Directors

Reasons for nominating candidates for directors selected at the 152nd General Meeting of Shareholders are described in "Convocation Notice of the 152nd Annual Shareholders' Meeting" posted on the NGK website (<https://www.ngk-insulators.com/en/ir/>) for reference. Reasons for selecting candidates for audit & supervisory board members (excluding outside audit & supervisory board members) whose re-elections are not due at the 152nd General Meeting of Shareholders are as follows:

Reference URL	NGK website https://www.ngk-insulators.com/en/ir/
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Mr. Takeyuki Mizuno:

After accumulating experience in technology development in the ceramic products business division, Mr. Takeyuki Mizuno has experienced business operations focused on manufacturing, such as engaging in the start-up of the ceramic products division for semiconductor manufacturing equipment. He also served as the manager of the manufacturing engineering division as well as the chairman of the Quality Committee and the Environmental Protection Committee. NGK has appointed him as a candidate for audit & supervisory board member as NGK believes that his knowledge based on such experience is beneficial to the audits of NGK.

Mr. Ken Sugiyama:

After joining NGK, Mr. Ken Sugiyama had long served in the finance & accounting division and has served as general manager of the Finance & Accounting Department. In addition to engaging in the business operations of overseas subsidiaries, he also served as the general manager of the Auditing Department. NGK has appointed him as a candidate for audit & supervisory board member as NGK believes that his abundant knowledge and experience relating to financial accounting and business audits based on such experience is beneficial to the audits of NGK.

Supplementary Principle 4-1-1. Outline of the Scope of Matters Delegated to the Management

At NGK, matters prescribed by laws and regulations to be resolved at the Board of Directors, and corresponding matters deemed necessary to be resolved at the Board of Directors in light of their significance and characteristics, etc., are decided and resolved at the Board of Directors. The Board of Directors deliberates on the formulation of management strategies and management plans to provide a strategic direction for the achievement of NGK's management philosophies, and delegates decisions on business execution to NGK's management based on such direction.

Matters to be judged and determined by the Board of Directors are specifically prescribed in the Articles of Incorporation and the Board of Directors' Regulations of NGK, which primarily include company-wide unified budgeting, strategic planning such as dissolution, mergers, and alliances of the company, share-handling regulations, determination to call a General Meeting of Shareholders, appointing and removing representative directors, approval of financial statements, business reports, etc., the disposal and acceptance of transfer of important assets (long-term holding securities, land, equipment, etc.), the appointment and dismissal of an important employee, and the establishment and change of important organizations.

NGK has introduced a corporate officer system, thus separating management decision-making and business execution to expedite decision-making, and matters other than the above are decided by the management pursuant to the administrative authority table prescribed separately.

Principle 4-9. Independence Standards for Independent Outside Directors

In addition to the requirements for an outside director under the Companies Act and for an independent director specified by the Tokyo Stock Exchange, NGK may not designate a person who falls under any of the following items as an outside director with independence (hereinafter referred to as the "Independent Outside Director"); provided, however, that if NGK considers that such person, who falls under any of the items, is appropriate as the Independent Outside Director of NGK in light of such person's personality, insight, etc., NGK may designate said person as an Independent Outside Director on the condition that said person satisfies the requirements for an outside director under the Companies Act and for an independent director specified by the Tokyo Stock Exchange as well as on the condition that NGK externally explains the reason why such person is appropriate as the Independent Outside Director of NGK.

In these independence standards, a person who executes business refers to an executive director, executive officer, corporate officer, manager, or other employee, and NGK Group refers to NGK or NGK's subsidiaries or affiliated companies.

1. A major shareholder who holds 10% or more of the current voting rights of NGK. If such major shareholder is a corporation, a person who has executed the business of said corporation during the last three fiscal years including the most recent fiscal year.
2. A person who currently executes the business of a business partner where the amount of transactions between NGK Group in any of the last three fiscal years including the most recent fiscal year is 2% or more of the consolidated sales of either said business partner or NGK Group.
3. A person who has executed the business of a financial institution or other corporation that is a major creditor, which is indispensable for NGK Group's fundraising and on which NGK Group depends to the extent that it is irreplaceable, in the past three fiscal years including the most recent fiscal year.
4. An incumbent director or officer of an organization that receives a donation or grant from NGK Group in the amount exceeding ¥10 million per year or 30% of average annual total expenses of such organization, whichever the greater, in any of the last three fiscal years including the most recent fiscal year.
5. A certified public accountant, tax accountant or an incumbent employee of an auditing firm or tax accounting firm who served as an accounting auditor or accounting advisor of NGK Group in the past three fiscal years including the most recent fiscal year.
6. A person who is a lawyer, certified public accountant, tax accountant, or other consultant who does not correspond to any of the individuals mentioned in 5. above and who, in addition to his/her remuneration as an officer, has received cash and other property benefits of ¥10 million or more per year from the NGK Group in the past three fiscal years including the most recent fiscal year, or an incumbent employee, etc., of a law firm, auditing firm, tax accounting firm, consulting firm, or other advisory firm that does not correspond to any of the firms mentioned in 5. above, which received a payment of more than 2% of its annual consolidated gross sales from NGK Group in any of the last three fiscal years including the most recent fiscal year.
7. A person who has executed the business of a company, of which NGK is currently a major shareholder, in the last three fiscal years including the most recent fiscal year.
8. Relatives within the second degree of kinship to a person who falls under the items 1 to 7 above.

Supplementary Principle 4-11-1. Views on the Balance Between Knowledge, Experience, and Skills of the Board of Directors as a Whole, and Diversity and Size of the Board

At NGK, the Board of Directors is comprised of persons who have practical experience in business operations in various business fields, such as manufacturing technology, research and development, sales, and planning as well as leadership, persons who have knowledge of finance, legal affairs, and labor affairs, highly independent external personnel who have a high level of expertise in legal affairs, corporate finance, etc., and knowledge, etc., of international affairs, social and economic trends, and the Articles of Incorporation of NGK stipulate that the number of directors shall not exceed fifteen. NGK recognizes that the appointment of young as well as foreign persons is a priority issue for ongoing consideration in terms of necessity associated with future business expansion.

Supplementary Principle 4-11-2. Status of Directors and Audit & Supervisory Board Members Who Also Serve as Officers at Other Listed Companies

With regard to the status of directors and audit & supervisory board members who also serve as directors and audit & supervisory board members at other companies, NGK discloses such status each year in its convocation notice of the General Meeting of Shareholders, annual securities reports, and report on corporate governance.

Supplementary Principle 4-11-3. A Summary of the Results of Analyses and Evaluation on the Effectiveness of the Board of Directors

The operation of meetings of NGK's Board of Directors has been conducted appropriately in accordance with the applicable laws and regulations, the Articles of Incorporation, and internal regulations, and discussions have been held actively in the meetings. With regard to its effectiveness, the Board of Directors issues a survey at the end of every fiscal year to directors and audit & supervisory board members. The results are reported at the Board of Directors' meeting, after the analysis and evaluation by an external organization. Based on the results of the Board of Directors evaluation conducted in fiscal 2016, the secretariat of the Board of Directors conducted initiatives in fiscal 2017 to improve the effectiveness of the Board of Directors. Such initiatives included interviewing directors and audit & supervisory board members individually, getting opinions on specific measures that can improve the effectiveness of the Board of Directors, and based on results of the interview, enriching discussions regarding themes related to long-term strategies. As a result, in the Board of Directors evaluation conducted in fiscal 2017, the Board of Directors was evaluated as effective, with its strength in how, under the leadership of the Chairman of the Board of Directors, each Director participates to conduct sound and transparent discussions while complying with governance requirements. We were evaluated by the external organization as having continued to retain this strength from the previous fiscal year. On the other hand, the following were raised as issues that needed to be further examined for their status or to be further discussed at Board of Directors' meetings: a succession plan for the chief executive officer, cultivation of senior management, and understanding of risks for important, large-scale projects. Based on these results, NGK will work to continue to maintain and strengthen the effectiveness of the Board of Directors.

Supplementary Principle 4-14-2. Training Policies for Directors and Audit & Supervisory Board Members

Taking into account that directors and audit & supervisory board members assume the duty of care of a good manager as a fiduciary of NGK, NGK has established training policies to provide the following opportunities to improve their skills and knowledge so that they can adequately fulfil their respective responsibilities as an expert in management or as a supervisor of business execution.

1. Training for internal officers relating to the Companies Act, Financial Instruments and Exchange Act, competition laws, and corporate governance and compliance.
2. The provision of individual explanations from the relevant divisions to outside directors/audit & supervisory board members mainly relating to the items brought up at the Board of Directors' meetings as well as the periodical provision of information to and opportunities to exchange opinions with outside directors/audit & supervisory board members on the business environment and issues.

Principle 5-1. Policy for Measures and Organizational Structures Aimed at Promoting Constructive Dialogue with Shareholders

NGK strives to provide accurate and prompt explanations concerning business conditions and operational policies and to maximize its corporate value through mutual communication between shareholders and investors. With regard to the requests of meetings, questions at the General Meeting of Shareholders, and inquiries through NGK's website from shareholders and investors, both NGK's Finance & Accounting Department and General Affairs Department, under the direction of directors responsible for these departments, sincerely respond to shareholders and investors in close cooperation with the Corporate Strategy Office, Corporate Communications Department, Legal Department, and other departments where appropriate, thereby working to promote constructive dialogue with shareholders.

NGK also places emphasis on opportunities to conduct direct dialogue with institutional investors, and holds financial results briefings (twice each year) and overseas IR (twice each year) and others with the senior management.

NGK provides feedback to its management by regularly reporting the results of such dialogue to the Board of Directors, thereby leading to the improvement of the efficiency and transparency of management.

NGK conducts dialogue with shareholders and investors for the purpose of improving corporate value and capital efficiency as well as the promotion of sustainable growth, and given that the disclosure of unpublished material facts in the dialogue will impair the equality among shareholders, NGK, in principle, has no intention to disclose unpublished material facts.

Internal Control Systems

The Board of Directors and the executive bodies overseen by the president are responsible for establishing and operating NGK's internal control system. The Auditing Department, a specialized internal audit body, is responsible for assessing the status of business execution at each operating division. Moreover, NGK has established the Internal Controls Committee to manage its reporting system for internal controls pursuant to Japan's Financial Instruments and Exchange Act.

The NGK Group Guidelines for Corporate Behavior were formulated as a policy embodying the Group's corporate philosophy. These guidelines specify the Group's fundamental stance with respect to business activities and corporate behavior to ensure it remains a company that is beneficial to society, even in the pursuit of its economic goals. The CSR Committee, under which the Compliance Subcommittee, Security Subcommittee, and Social Contribution Subcommittee are organized, is responsible for a range of activities that include formulating NGK Group Guidelines for Corporate Behavior, ensuring compliance with laws, regulations and corporate ethics is fully entrenched throughout the Group, and developing responses to incidents and accidents which it believes could significantly impact the Company. The Committee's actions are designed to maintain and improve the level of the Group's internal control system.

Please note that the "Resolution for the Development of Systems to Ensure the Appropriateness of Operations" was amended at a Board of Director meeting held in March 2017.

Thorough Enforcement of Compliance

Viewing compliance as the foundation of CSR, the NGK Group positions enhancing trustworthiness as the most important initiative and strives to create specific systems to inculcate this view among employees, prevent corruption, and comply with laws and regulations.

NGK Group Guidelines for Corporate Behavior

To realize and protect the NGK Group corporate philosophy of creating new value by providing products and technologies that contribute to a better social environment, we established the NGK Group Guidelines for Corporate Behavior and thoroughly promote awareness.

In the spirit of the NGK Group Guidelines for Corporate Behavior, overseas Group companies establish policies according to the characteristics of each company, nation, and region.

Guidelines for Corporate Behavior and Thorough Dissemination of Behavioral Guidelines

We, the NGK Group, thoroughly ensure that every employee knows the NGK Group Guidelines for Corporate Behavior and Behavioral Guidelines, which each individual is expected to follow. We have created awareness handbooks and distributed them to all employees, including contract manufacturing employees and temporary employees, at NGK and all Group companies in Japan. In addition, we hand out a paper on awareness in April every year. Efforts are also made to ensure a thorough understanding among NGK employees through training for new graduates and experienced recruits upon joining the company. We further explain the Guidelines repeatedly at promotion-related training.

Top management also explain themselves the significance and purpose of the Guidelines for Corporate Behavior and Behavioral Guidelines at CSR Talk Live events, which the NGK Group holds.

In light of the Guidelines for Corporate Behavior, overseas Group companies establish policies according to the characteristics of each company, nation, and region.

Reference URL	Corporate Philosophy and Guidelines for Corporate Behavior https://www.ngk-insulators.com/en/info/governance/index.html
Reference Page	CSR Talk Live P98

Compliance Promotion Structure

We established the Compliance Subcommittee under the CSR Committee to ensure strict observance of laws, regulations, and corporate ethics within the Group. The Security Subcommittee has also been established to ensure accident prevention measures are in place, widely known, and strictly practiced.



Establishment of the Global Compliance System

With the aim of building a group-wide foundation for an effective compliance scheme at the global level, the Group Compliance Department conducts education on compliance at bases in and outside Japan.

Mission of the Group Compliance Department

- Works to establish and develop compliance as a corporate culture of the entire NGK Group
- Supports Group companies inside and outside Japan in strengthening and operating their compliance systems, and actively provides compliance training
- As for overseas Group companies in particular, ensures effective compliance for our globalized operations by obtaining the most up-to-date information regarding applicable laws and social demands in each region

Promoting Compliance Education

Compliance Training for Employees

Compliance training and awareness among corporate officers and employees is driven primarily by the Group Compliance Department and the Legal Department. In addition to career training and training for employees to be posted overseas, we provide Laws and Compliance Seminars to explain laws and regulations and to introduce case studies.

As new initiatives undertaken in fiscal 2017, we provided competition laws and anti-bribery regulations online seminars aimed primarily at management and sales staff, while at Group companies, compliance training (general) was provided to executives and managers.

Also, like the previous fiscal year, seminars were provided on competition laws, anti-bribery regulations, and general compliance to overseas Group companies.



Compliance seminar held at NGK Automotive Ceramics USA

Compliance Education Conducted in Fiscal 2017 (Overall)

Title	Target	Content	Number of sessions
Career Education	New hires	Compliance basics, competition laws, anti-bribery regulations	2
	Promoted or career-changed employees	Compliance basics	3
	Experienced recruits	Compliance basics, competition laws, anti-bribery regulations	1
	Newly appointed supervisors	Compliance, competition laws, anti-bribery regulations	1
	Newly appointed managers	Compliance, competition laws, anti-bribery regulations	1
	Managers promoted second grade	Compliance	1
Training for employees scheduled for postings abroad (global training)	Employees scheduled for postings abroad	Competition laws, anti-bribery regulations	1
Compliance education	Overseas Group company managers and sales staff	General compliance, competition laws, anti-bribery regulations, data security, hotlines, etc.	22
	Japanese Group company executives	Compliance	5 (18 companies)
	Japanese Group company managers	Compliance	10 (9 companies)
Laws and Compliance Seminars	Managers and other targets depending on content	(1) Self-Defense for Overseas Business Trips and Postings (2) Contract Basics Lecturer: Internal lecturer / 556 participants in total (1) Contacting the Fire Brigade During a Fire (2) Preventing Power Harassment and Bullying Lecturer: Consulting attorney / 591 participants in total Competition Laws Compliance Lectures Lecturer: Outside attorney / 659 participants in total Subcontract Act Basics Lecturer: Internal lecturer / 731 participants in total Latest Trends in Insider Trading Regulations Lecturer: Internal lecturer / 514 participants in total Fair Disclosure Rules—Focusing on General Meeting of Shareholders Lecturer: Internal lecturer / 207 participants in total	6
Other training	Divisions and Japanese Group companies	Subcontract Act explanatory meeting	3

Competition Laws Education Conducted in Fiscal 2017

Title	Target	Content	Number of sessions
Competition Laws Compliance Lectures	All corporate officers, all managers, and salespeople of NGK and its Group companies in Japan	Lectures provided by attorneys and DVD-based training	8
Overseas Group Company Compliance Training	Overseas Group company managers and sales staff	Lectures provided by attorneys and paper materials-based in-house training on compliance (data security, hotlines, etc.), competition laws, and anti-bribery regulations	25 (including 4 in-house training sessions)
On-demand training on competition laws by internal lecturer	Targets depending on content	On-demand training upon divisions' request	2
Training on competition laws for Japanese Group companies	Japanese Group companies	Explanation of specific regulations and behavior for competition laws compliance at Soshin Electric	1

Anti-Bribery Training Conducted in Fiscal 2017

Title	Target	Content	Number of sessions
Training on anti-bribery regulations for overseas Group companies	Overseas Group company managers and sales staff	Lectures provided by attorneys and paper materials-based in-house training	25 (including 4 in-house training sessions)

Other Dissemination Programs



Themes Covered in the Compliance Newsletter in Fiscal 2017

April	Information security
May	Intermingling of public and private affairs
June	Concealment of on-the-job accidents
July	Power harassment
August	Copyright
September	Shame reduction

October	Corporate ethics month
November	Safety management
December	Human rights week
January	Drinking alcohol
February	Quality inspection
March	Social media

In fiscal 2017 as well, we posted the Compliance Newsletter on the company's intranet once a month. The Newsletter features a four-frame cartoon that explores familiar themes followed by detailed explanations.

Corruption Prevention Structure

The NGK Group implements anti-bribery measures in order to ensure fair and transparent transactions. In fiscal 2015, we instituted anti-bribery rules for dealing with foreign public officials in order to ensure compliance with anti-bribery laws as well as ethical standards for business conduct. Further, in fiscal 2017 our Auditing Department performed a review of overseas money transfers and entertainment expenses.

Conducting Anti-Bribery Training

In fiscal 2017, our in-house lecturers provided job grade-specific training to NGK employees. In addition, we also arranged for attorney-led seminars and other training at all overseas Group companies.

Observing the Competition Law and Other Laws and Regulations Pertaining to Business Transactions

In addition to mandating compliance with the Antimonopoly Act in the NGK Group Guidelines for Corporate Behavior, we have established Competition Laws Compliance Rules, set forth to comply with international standards, which are strictly enforced by NGK both in Japan and its overseas locations. We have established these policies and procedures in order to eradicate unfair business practices and maintain fair and equitable business relationships with our business partners.

We also provide education and training aimed at ensuring widespread awareness and thorough compliance with the Competition Laws Compliance Rules and the Competition Laws Compliance Handbook. Furthermore, since fiscal 2015, we have contracted PwC Advisory LLC (renamed from Pricewaterhouse Coopers Co., Ltd. in March 2016) as our independent compliance professional to annually review the implementation status of the NGK Group's Competition Law compliance program per the Competition Law Compliance Rules as well as assessing the overall oversight and reporting structures in place for NGK Group companies, both in Japan and overseas locations. On top of this, starting in fiscal 2017, PwC has also conducted interviews with the directors overseeing NGK's various business groups to assess the tone of each director's approach toward competition law compliance as well as to further enhance their awareness of these efforts. The results of these reviews are being leveraged for a variety of purposes, such as improving the Competition Law compliance program.

Reference
URL

Plea Agreement with U.S. Department of Justice concerning ceramic substrates for catalytic converters

https://www.ngk-insulators.com/en/news/20150904_9235.html

Strengthening Our Compliance System Related to Competition Laws

Year conducted	Regulation Development	Creation of Internal Systems	Training
FY1997	<ul style="list-style-type: none"> Formulated guidebook and briefing document for the Anti-Monopoly Act 	<ul style="list-style-type: none"> Required each business group to submit a Compliance Status Report on the Anti-Monopoly Act 	<ul style="list-style-type: none"> Lectures on the Anti-Monopoly Act by outside instructors (attorneys) (subsequently held annually)
FY2011	<ul style="list-style-type: none"> Formulated Competition Laws Compliance Rules 		
FY2012	<ul style="list-style-type: none"> Created and distributed the Competition Laws Compliance Handbook Created and distributed an Appendix to the Competition Laws Compliance Handbook 	<ul style="list-style-type: none"> Established an independent committee 	<ul style="list-style-type: none"> In-house training led by legal department staff Lectures by local attorneys held at overseas subsidiaries
FY2013			<ul style="list-style-type: none"> Conducted briefing on the Competition Laws Compliance Handbook Invited U.S. attorneys to lecture on competition laws
FY2014	<ul style="list-style-type: none"> Revised Competition Laws Compliance Rules Launched operation of a database for advanced notifications and participation reports pertaining to meetings Launched operation of an e-mail monitoring system Revised Competition Laws Compliance Rules at North American sales subsidiaries 	<ul style="list-style-type: none"> Introduced company-wide centralized supervision and reporting structures led by the Board of Directors (independent of the President) Appointed company-wide competition laws supervisory managers Enhanced the helpline 	<ul style="list-style-type: none"> Conducted study meetings for newly appointed directors on competition laws and the Companies Act by Japanese and U.S. attorneys (subsequently held annually) Conducted study meetings on competition laws at overseas Group companies (corresponding to laws and regulations in each country)
FY2015	<ul style="list-style-type: none"> Competition Law Compliance Rules of all NGK Group companies in and outside Japan were revised to ensure that the NGK Group's compliance system meets global standards Revised the Competition Laws Compliance Handbook 	<ul style="list-style-type: none"> The Competition Laws Compliance Program was resolved by the Board of Directors Established the Global Compliance Office Contracted Pricewaterhouse Coopers to review the implementation status of the NGK Group's Competition Law compliance program and assess the overall oversight and reporting structures in place for NGK Group companies 	<ul style="list-style-type: none"> Conducted study meetings on competition laws for new employees Distributed a DVD on competition laws to domestic group companies Upgraded training on compliance with competition laws provided inside and outside Japan
FY2016	<ul style="list-style-type: none"> The U.S. version and Chinese version of the Competition Laws Compliance Handbook were created and distributed to Group companies in the U.S. and China, respectively 	<ul style="list-style-type: none"> Progress status of the Competition Laws Compliance Program was quarterly reported to the Business Ethics Committee, which is composed mainly of external directors. The Program was promoted based on suggestions received from the Committee. Retained PwC Advisory to assess the status of competition law compliance 	<ul style="list-style-type: none"> Expanded seminars led by attorneys in Asia Seminars on the Companies Act and competition laws were held for newly appointed executive officers Prepared online-based training aimed at realizing broader training programs
FY2017	<ul style="list-style-type: none"> Operating manual for database used to document competition laws compliance underwent maintenance and updating 	<ul style="list-style-type: none"> Competition laws compliance awareness-raising implemented among all top management at headquarters, business groups, and Group companies at the start of the fiscal year 	<ul style="list-style-type: none"> Online seminars provided to 861 employees in Japan

Strict Adherence to Laws and Regulations Relating to Export Management

As part of its full compliance efforts, NGK is engaged in strictly observing laws and regulations related to import and export control. NGK establishes the observance of security export control-related regulations as part of Behavioral Guidelines within the NGK Group Guidelines for Corporate Behavior, and makes sure to control import and export operations by training its employees based on internal rules and the Export/Import Handbook.

Using Databases to Conduct Comprehensive Inspections and Customs Management

In response to the Foreign Exchange and Foreign Trade Act and other export control-related laws and regulations, NGK has screened exports to determine whether export licenses are required and has recorded screening results in a security export control database. However, since October 16, 2017, we have moved to a security export control system (TPP) and are performing management via this new system. Furthermore, export management with respect to the export of certain products is conducted using a specified export declaration system.

We have used an export/import cargo management ledger to fulfill our obligations to track and record imports and exports; however, since our switch to a security export control system (TPP), we have been using the system's shipment ledger to track and record exports. We continue to use an import cargo control ledger for imports. Each department performs voluntary inspections of imports and specified exports at the start of the fiscal year.

In addition, we use NACCS data (Nippon Automated Cargo and Port Consolidated System) to verify the completeness of export/import cargo management ledgers and shipment ledgers. We have achieved nearly 100% completeness for both imports and exports.

Familiarization with the Export/Import Handbook

NGK also makes efforts toward thorough compliance with the Export/Import Handbook, which was published in fiscal 2012 and summarizes items for the observance of export/import customs clearance regulations.

In addition to publishing this handbook on the company intranet where it can be viewed throughout the entire company, we provide training to spread awareness of the content of the handbook through study meetings related to export/import management conducted in each business division.

Export/import management study meetings are held one or more times per year targeting relevant staff in divisions responsible for export and import activities. In fiscal 2017, these meetings were held 23 times, with 496 employees in attendance.



The Export/Import Handbook

Privacy Policy and Structure

The NGK Group has established internal rules for privacy policy management in an effort to ensure strict handling, management, and protection of personal information provided by customers. In fiscal 2015, NGK formulated and made public our Basic Policy on Specific Personal Information in response to the enforcement of the Act on the Use of Numbers to Identify a Specific Individual in Administrative Procedures. Moreover, our policies are in full compliance with the revised Act on the Protection of Personal Information, which came into effect on May 30, 2017. In fiscal 2017, we amended our privacy policy to clarify our policy on shared usage of personal information among Group companies in Japan.

Additionally, we are updating the rules and regulations for our EU-based affiliates in order to comply with the EU's General Data Protection Regulation that went into effect on May 25, 2018.

Reference
URL

Protection of personal information

<https://www.ngk-insulators.com/en/utpolicy/index.html>

Basic Policy on Specific Personal Information

<https://www.ngk.co.jp/mynumber/index.html>

Information Security Policy and Structure

The NGK Group CSR Committee's Security Subcommittee takes responsibility for supervising overall information security, and supports the General Affairs and Information Systems divisions based on the Basic NGK Group Information Security Policy, in an attempt to properly manage and operate information assets.

Every year, personnel of NGK's Information Technology Department visit several Group companies to conduct on-site checks and provide guidance on their implementation of IT security measures. In fiscal 2017, 15 overseas Group companies received such inspections.

Reference
URL

Basic NGK Group Information Security Policy
<https://www.ngk-insulators.com/en/info/governance/index.html>

Formulation of Basic NGK Group IT Security Standards

The rapid advance in information communication technologies and devices has made the quest for consistent IT security on a Group-wide level an urgent concern, thus in fiscal 2010 we formulated the NGK Group IT Security Standards with the goal of developing an IT security structure based on commonly shared Group standards and enhancing IT security.

Every year, each Group company drafts action plans for the enactment of countermeasures in an attempt to systematically strengthen security. Through these action plans, NGK confirms initiatives at each Group company and provides guidance as necessary.

Information Security Training

Training sessions listed on the right are conducted throughout the year to ensure strict adherence to information security among all employees.

Training for newly hired employees and newly promoted supervisors and managers are offered to NGK employees while e-learning is offered to NGK employees and employees of some Group companies in Japan.

Training for newly hired employees	Number of participants: 111 (participation rate: 100%)
Training for newly promoted supervisors	Number of participants: 102 (participation rate: 100%)
Training for newly promoted key personnel	Number of participants: 44 (participation rate: 100%)
E-learning	Number of participants: 4,321 (participation rate: 100%)

Note: Excluding employees who were away on maternity leave, childcare leave, long-term business trips, etc.

Status of Law and Regulation Violations

There were no violations of laws or regulations in fiscal 2017.

Risk Management

In line with business expansion, the NGK Group is also engaged in minimizing risks related to globalization and diversification while augmenting our risk management structure. The CSR Committee periodically confirms and follows up on the status of Group-wide risk countermeasures to ensure every effort is being made to manage business risks.

Basic Approach

The NGK Group Guidelines for Corporate Behavior were announced within and outside the company as our basic stance toward the realization of the NGK Group corporate philosophy of creating new value by providing products and technologies that contribute to a better social environment. This includes initiatives that strictly observe the protection of third-party rights and corporate assets and trust through the practice of risk management.

Reference URL
Corporate Philosophy and Guidelines for Corporate Behavior
<https://www.ngk-insulators.com/en/info/governance/index.html>

Risk Analysis and Response

There are six types of risk which are viewed as common to all companies within the NGK Group, including compliance, information, and employment/labor. We make an effort to avoid and prevent these risks through deliberation of budgets and plans and overall examination and analysis in the course of execution and settlement processes at Strategy Committee and Executive Committee meetings.

Business continuity planning (BCP) was formulated to ensure the continuation of critical business functions in the event of large-scale natural disasters including wind and flood damage and earthquakes, massive transportation accidents or other emergency situations, which will be addressed by the Central Disaster Prevention and Control Headquarters and BCP Countermeasures Headquarters.

Company-Wide Shared Risks

Category	Risk
1. Compliance	Legal/regulatory infractions, improper accounting
	Misappropriation by individuals
	Bribery
	Violation of intellectual property rights
	Human rights violations, harassment
	Trouble with local communities
	Response to antisocial forces
2. Information	Information systems breakdown
	Leak of proprietary or personal information
	Inappropriate use of social media

Category	Risk
3. Employment/Labor	Labor troubles
	Labor accidents
	Traffic accidents
	Long working hours, health management
	Support for unskilled labor
	Labor issues at suppliers and subcontractors
4. Incidents/Accidents/Disasters	Incidents and accidents
	Natural disasters
5. Environment	Environmental management trouble
	EMS insufficiency
6. Product Safety	Defective products

Business Risks

We have identified the following risks which have the potential to impact the operating results, share price, financial position, etc., of the NGK Group.

Production Bases

The NGK Group's main production bases are located in Aichi Prefecture and Ishikawa Prefecture in Japan, and overseas in the Americas, Europe, Asia, and other regions. The Group operates a global production system for its core products, such as ceramic honeycomb substrates for automotive catalytic converters, from the perspective of manufacturing close to demand centers and achieving optimal production. This ensures that risk is dispersed among manufacturing sites. However, irrespective of whether a production base is in Japan or overseas, if facilities at a major production base are seriously damaged by a natural disaster such as an earthquake or fire, production may stop for a considerable period of time, thereby adversely affecting the NGK Group's business performance and financial condition. Overseas operations, in particular, carry such potential risks as i) compliance with the host country's laws, regulations or taxes, ii) adverse changes in the economic environment such as fluctuations in exchange rates, iii) difficulty in securing, educating and training personnel, iv) inadequate infrastructure, and v) societal problems such as terrorism and war.

The unforeseen occurrence of any of these events could adversely impact the NGK Group's business performance and financial condition.

Exchange Rates, Interest Rates, and Material Prices

The NGK Group produces and sells products worldwide. Consequently, the Group hedges the risk of short-term changes in the exchange rates of major currencies, particularly the U.S. dollar, euro and yen, with forward foreign exchange contracts and other financial instruments. However, appreciation of the yen could cause a decline in net sales and earnings, which could adversely impact the NGK Group's business performance.

The NGK Group plans to continue making the necessary capital investments to expand its businesses and improve productivity. The Group's funding needs include these capital expenditures and the redemption of corporate bonds. In the event of interest rate rises, future fund procurement costs may increase, which could adversely impact the NGK Group's business performance and financial condition.

Rises in raw materials prices have led to higher manufacturing costs at NGK Group businesses. To minimize this factor, the Group raises sales prices, cuts costs, improves productivity, and reduces business expenses. The NGK Group endeavors to absorb rises in purchasing prices, but excessive rises in the prices for raw materials may adversely impact the Group's business performance and financial condition.

New Products

The NGK Group works to create new products to secure its growth prospects. The Group makes focused investments in new products that should become pillars of growth in the future. At the same time, NGK is making capital expenditures in stages for products for which demand is expected to expand.

However, in the event that these capital expenditures are not made on schedule, this may adversely impact the NGK Group's medium-term growth prospects.

Changes in the Business Environment

Demand for the products that the NGK Group manufactures and sells is strongly influenced by changes in the economic climate in and outside of Japan. Such changes may adversely impact the Group's business performance and financial condition.

Product Quality

Guided by its Corporate Quality Policy, the NGK Group conducts quality-related activities in a committed drive to ensure consistent high quality. These efforts notwithstanding, the Group cannot completely eliminate the possibility of quality-related issues from every product that it sells or manufactures. The occurrence of such problems could therefore have a substantial and adverse impact on the Group's business performance.

International Investigation Related to Competitive Conditions

The NGK Group is currently the subject of an international investigation related to competitive conditions and is giving its full cooperation. The investigation is being conducted by authorities concerned with competition, and depending on the outcome, there may be an adverse impact on the Group's business performance and financial position.

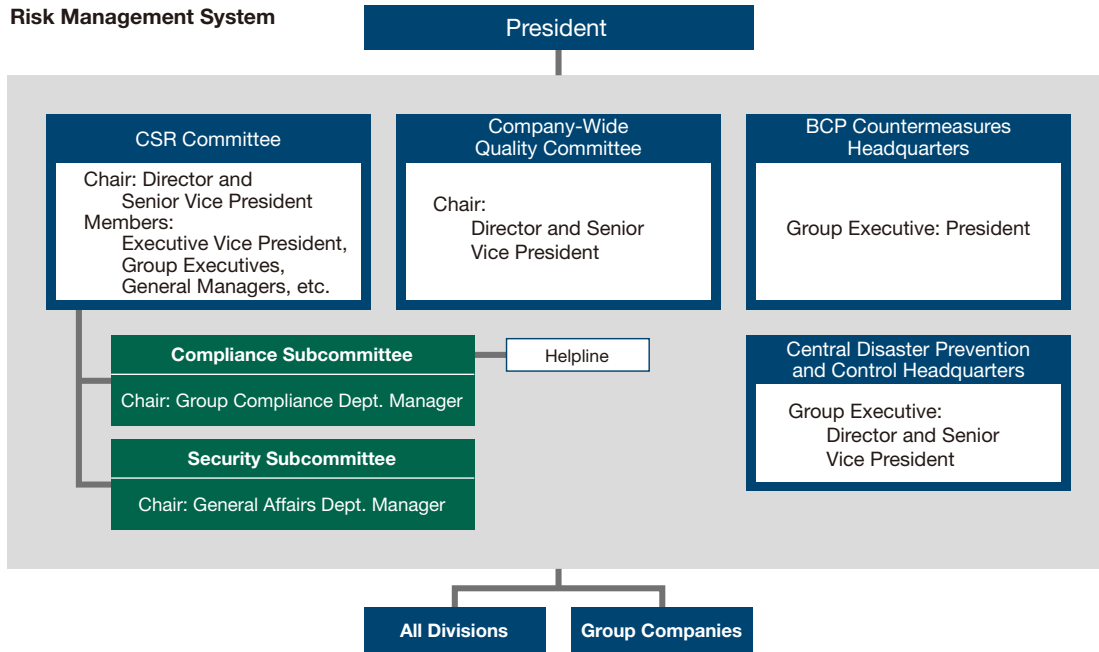
Reference
URL

Plea Agreement with U.S. Department
of Justice concerning ceramic substrates
for catalytic converters

https://www.ngk-insulators.com/en/news/20150904_9235.html

Risk Management System

NGK operates a risk management promotion structure led mainly by the CSR Committee. A person of responsibility and response structure is established for each risk category in an effort to improve risk response capabilities and risk prevention activities.



Risk Response

Normal operations	Follow up by CSR Committee and other committees	
Emergency situation	Legal/ethical or incident/accident response	CSR Committee is in charge. Initial response by eight people chosen ahead of time to handle emergencies + relevant corporate officers
	Quality-related accidents	Company-Wide Quality Committee is in charge
	Disaster-related incidents	Central Disaster Prevention and Control Headquarters and BCP Countermeasures Headquarters are in charge

Identifying and Preventing Risks Based on Questionnaire

As part of an effort to enhance risk management practice, NGK and its domestic Group companies have been conducting the CSA (Control Self-Assessment) questionnaire. In fiscal 2017, the CSA questionnaire and the compliance awareness survey were combined into the CRS (Corporate Risk Survey).* The aim of this survey is to grasp and prevent various potential risks arising from daily business operations, and check the understanding of respondents regarding potential risks and their impact. Based on the results of the survey, risk management measures are planned by the relevant divisions and departments in order to reduce risks.

*Survey conducted in December 2017, targeting 2,008 people. The number of respondents was 1,836 (response rate 91.4%).

Risk Management Measures Based on the CSA Questionnaire

Group-wide risk response measures formulated by risk response departments and divisions*

Category	Measures scheduled for 1st half FY2018
Group/General	Ongoing monitoring on understanding of responses to incidents specified in the internal Basic Rules of Crisis Management
Compliance	<ul style="list-style-type: none"> • Ongoing compliance training for competition laws, anti-bribery regulations, intellectual property policies, etc. • Quality-related compliance training • Preparations for contract compliance-related training
Information	<ul style="list-style-type: none"> • Review and registration of Document Control Managers, etc. • Review content for implementation of information leakage-related training • Ongoing introduction at Group companies of targeted attack prevention system
Employment/Labor	<ul style="list-style-type: none"> • Ensure employees receive two "refreshment days" a week • Work time management; follow up on health support for long-hour workers • Establish targets for overtime work reduction
Incidents/Accidents/ Disasters	<ul style="list-style-type: none"> • Communications drills anticipating overseas emergencies • Ongoing implementation of machine keeper training and predictive maintenance tool operations assessment • Health and safety audit of Japanese and overseas Group companies • On-site reviews/audits of environmental management status at Japanese and overseas Group companies
Product Safety	<ul style="list-style-type: none"> • Establish business quality improvement targets and provide support for business division quality-related risk elimination • Update and promote awareness of quality compliance-related rules • Regular audits of important component suppliers

*Human Resources Dept., Legal Dept., Intellectual Property Dept., Group Compliance Dept., General Affairs Dept., Purchasing Dept., Information Technology Dept., Corporate Planning Office, Environmental Management Dept., Quality Management Dept., Safety & Industrial Health Management Dept., Manufacturing Engineering Dept., Construction & Maintenance Dept., Global Engineering Center

Legal Risk Management at Overseas Group Companies

The NGK Group is engaged in strengthening its ascertainment of legal risk management status in overseas business to minimize the globalizing and diversifying risks associated with business expansion.

We ask all overseas group companies to report information pertaining to the status of lawsuits, legal affairs and consultation with lawyers twice a year, and helpline usage, export controls and access to legal-related information once a year. Major issues found in such reports are reported to the Compliance Subcommittee and CSR Committee to share information.

Consultations from overseas locations are handled by lawyers and legal departments to avoid risks.

Business Continuity Planning (BCP) Initiatives

The NGK Group is developing company-wide business continuity planning (BCP) through the establishment of the BCP Headquarters, an organization for leading business continuity and quick recovery in the event of a large-scale natural disaster, led by the President. Countermeasure initiatives include the establishment of multiple manufacturing bases and procurement sources, damage mitigation measures related to buildings and equipment, and employee safety assurance.

We conduct emergency drills assuming a natural disaster as a field exercise of the BCP. In the drill, participants are instructed to take real actions faithfully according to the plan, through which we identify in detail issues related to each process and procedure and use the findings to improve the BCP.

Fiscal 2017 Initiatives

- Real-time simulation training was implemented for business group members, individual committees, and among committees of the Nagoya, Chita, and Komaki sites
- Earthquake-induced liquefaction and typhoon storm surges were added to damage estimation, and risk responses were enhanced

Future Initiatives

- Improve BCP effectiveness via more practical drills involving more advanced drill scenarios, more participants, a larger scope, etc.
- Clarify procedures of gathering/communicating/sharing disaster information, perform up-skilling of supervisors and representatives



BCP business group training drill



Wet weather evacuation drill

Intellectual Property Management

The NGK Group encourages the creation of intellectual property (IP) rights and works to ensure proper protection and use of IP rights. In addition, based on the policy of respect for the rights of others and ourselves, it aims for a strategic patent network to be built within the close cooperation between the Intellectual Property Department and other divisions such as Business, Research and Development, and Technology Divisions.

Specifically, it features a patent mapping function to present the internal and external patent landscape of specific technology areas using charts and graphs, which can be easily shared within the Group.

To prevent patent infringement risks, we regularly conduct patent monitoring of other companies for product family and development theme to update our database.

Number of patents held
as of March 31, 2018

National patents
of Japan

3,191

Foreign patents

4,186

Responsibilities of the Intellectual Property Department

- Application for/acquisition of IP rights (patent, utility model, design):
Establish IP rights for NGK's research and development achievements to safeguard corporate assets on a legal basis
- Patent search:
Survey the current patent landscape of other companies to prevent patent infringement risks
- Administration and operation of patent management systems
- Administrative work relating to acquired patent rights, including maintenance of rights, payment of patent incentives, and cooperation with patent law firms
- Application for/acquisition and maintenance of trademark rights for corporate logos and product trade names and marks
- Copyright
- In house training of Intellectual Property

Awareness Programs for Managers

NGK has conducted manager class awareness programs to enhance intellectual property strategy in the Business and the Research and Development Divisions.

In March 2017, we held the 9th session of the lecture series "Considering Intellectual Property." Mr. Naoto Kuji, former general manager of Honda Motor's Intellectual Property Department, was invited to give a lecture about "IP Idea Combinations in the Near Future and Open Innovation." The program was focused for the activities of company and the activities of intellectual property under the Fourth Industrial Revolution. 150 employees attended the program.

Promoting Intellectual Property Training

Training for young engineers

E-learning and seminars were provided with the aim of providing basic training for young engineers and of up-skilling for patent applicants.

Also, focusing primarily on young engineers in the Research and Development Department, trainings in patent search methods were conducted. These methods were taught via individual, computer-based practical training.

Further, a new e-learning was provided for employees who write out documents and other materials for the proper handling of copyright.

IP Training Provided in Fiscal 2017

	Intended participants	No. of participants
Primer of Patent law, e-learning	Young engineers	68
Seminars on patent law system (Patent I, II, III)	Young engineers	118
Seminars on license agreement and IP strategy	Employees in charge	10
Seminars to acquire skills for using the IP search program	Employees in charge, engineers	85
Small-group workshop	Young engineers in the Business and the Research and Development Division	108 (total for 9 sessions)
Copyright e-learning	Employees who produce documents and other materials	4,313

Employee Invention Compensation System to Provide Incentives for Employee Inventions

From a legal viewpoint based on the Patent Act and in order to encourage inventions, NGK has established an employee invention compensation system comprised of application incentives, registration incentives, and implementation incentives to fairly compensate employees. Implementation incentives are distributed and paid to the inventors from part of the profits derived from the patents used in our profit-making products.

Group companies in Japan have established a similar employee invention compensation system, thereby seeking to spur the invention promotion initiative across the Group.

To further expand this effort globally, we are working to introduce an employee invention compensation system to overseas Group companies in consideration of local legal systems and labor practices, in order to facilitate employee inventions and protect individual inventors' rights.

Provision against Intellectual Property Risks Overseas

We strengthened IP activity collaboration with overseas Group companies for HPC business (semiconductor manufacturing equipment-related products). We supported FM Industries (a U.S.-based semiconductor manufacturing equipment-related metal products manufacturing group company) by analyzing NGK's technologies and patents with as well as those of competitors.

TOPIC

Overseas IP Training

NGK offers overseas training programs to develop international IP experts, sending young employees to the U.S. and Europe. In 2017, Masashi Yasui from the Intellectual Property Department received his Master of Laws degree from the Munich Intellectual Property Law Center (MIPLC) in Munich, Germany.



Mr. Yasui (left) from the Intellectual Property Department

GRI Guidelines Comparison Table

102 General Disclosures

		Page
GRI 102: General Disclosures 2016		
1 Organizational Profile		
102-1	Name of the organization	<ul style="list-style-type: none"> Corporate Outline (P140)
102-2	Activities, brands, products, and services	<ul style="list-style-type: none"> Main Products (P3-4) Value Creation by the NGK Group (P9-10)
102-3	Location of headquarters	<ul style="list-style-type: none"> Corporate Outline (P140)
102-4	Location of operations	<ul style="list-style-type: none"> Corporate Outline (P140) Annual Securities Report, Subsidiaries and Affiliated Companies (P7-11)
102-5	Ownership and legal form	<ul style="list-style-type: none"> Corporate Outline (P140)
102-6	Markets served	<ul style="list-style-type: none"> Corporate Outline (P140) Annual Securities Report, Overview of Business Results and Others (P5)
102-7	Scale of the organization	<ul style="list-style-type: none"> Corporate Outline (P140) Value Creation by the NGK Group (P9-10) Annual Securities Report, Financial Highlights (P2-3)
102-8	Information on employees and other workers	<ul style="list-style-type: none"> Overview of Employees (P59)
102-9	Supply chain	–
102-10	Significant changes to the organization and its supply chain	NA
102-11	Precautionary principle or approach	<ul style="list-style-type: none"> CSR Management (P25) Risk Management (P125-128)
102-12	External initiatives	<ul style="list-style-type: none"> Position on SDGs (P27) Human Rights Initiatives (P78)
102-13	Memberships of associations	<ul style="list-style-type: none"> Human Rights Initiatives (P78)
2 Strategy		
102-14	Statement from senior decision-maker	<ul style="list-style-type: none"> Message from the President (P13-18)
102-15	Key impacts, risks, and opportunities	<ul style="list-style-type: none"> Value Creation by the NGK Group (P9-10) Risk Management (P125-128)
3 Ethics and Integrity		
102-16	Values, principles, standards, and norms of behavior	<ul style="list-style-type: none"> CSR Management (P25) Environmental Philosophy (P31)
102-17	Mechanisms for advice and concerns about ethics	<ul style="list-style-type: none"> Whistle-Blowing System (P112)
4 Governance		
102-18	Governance structure	<ul style="list-style-type: none"> Corporate Governance Structure Scheme (P101)
102-19	Delegating authority	<ul style="list-style-type: none"> Environmental Management Frameworks and Environmental Management System (P32) Corporate Governance (P101)
102-20	Executive-level responsibility for economic, environmental, and social topics	<ul style="list-style-type: none"> Environmental Management Frameworks and Environmental Management System (P32)
102-21	Consulting stakeholders on economic, environmental, and social topics	<ul style="list-style-type: none"> Environmental Management Frameworks and Environmental Management System (P32) Basic Approach (P100) Corporate Governance Structure Scheme (P101)

102-22	Composition of the highest governance body and its committees	<ul style="list-style-type: none"> • Board of Directors, Audit & Supervisory Board, Executive Officers (P105-108) • Annual Securities Report, Board of Directors, Audit & Supervisory Board, Executive Officers (P59-63)
102-23	Chair of the highest governance body	<ul style="list-style-type: none"> • Committees on Corporate Governance (P102)
102-24	Nominating and selecting the highest governance body	<ul style="list-style-type: none"> • Election of Board Members, Executive Officers, and Audit & Supervisory Board Members (P104) • Corporate Governance Report, Views on the Balance Between Knowledge, Experience, and Skills of the Board of Directors as a Whole, and Diversity and Size of the Board (P2) • Corporate Governance Report, Items Concerning Functions of Supervision and Monitoring of the Performance of duties by Directors, Nomination, and Remuneration Policy (P9)
102-25	Conflicts of interest	<ul style="list-style-type: none"> • Outside Directors and Outside Audit & Supervisory Board Members (P107) • Election of Board Members, Executive Officers, and Audit & Supervisory Board Members/Approaches to Observe the Corporate Governance Code (P113)
102-26	Role of highest governance body in setting purpose, values, and strategy	
102-27	Collective knowledge of highest governance body	
102-28	Evaluating the highest governance body's performance	<ul style="list-style-type: none"> • A Summary of the Results of Analyses and Evaluation on the Effectiveness of the Board of Directors (P117)
102-29	Identifying and managing economic, environmental, and social impacts	<ul style="list-style-type: none"> • A Summary of the Results of Analyses and Evaluation on the Effectiveness of the Board of Directors (P117)
102-30	Effectiveness of risk management processes	<ul style="list-style-type: none"> • Risk Management (P125-128)
102-31	Review of economic, environmental, and social topics	
102-32	Highest governance body's role in sustainability reporting	
102-33	Communicating critical concerns	<ul style="list-style-type: none"> • Risk Management (P125-128)
102-34	Nature and total number of critical concerns	
102-35	Remuneration policies	<ul style="list-style-type: none"> • Remuneration of Directors and Audit & Supervisory Board Members (P109)
102-36	Process for determining remuneration	<ul style="list-style-type: none"> • Remuneration of Directors and Audit & Supervisory Board Members (P109)
102-37	Stakeholders' involvement in remuneration	
102-38	Annual total compensation ratio	
102-39	Percentage increase in annual total compensation ratio	
5 Stakeholder Engagement		
102-40	List of stakeholder groups	<ul style="list-style-type: none"> • Targeted Stakeholder and Response Policies (P29)
102-41	Collective bargaining agreements	<ul style="list-style-type: none"> • Annual Securities Report, Overview of Employees (P12)
102-42	Identifying and selecting stakeholders	<ul style="list-style-type: none"> • Targeted Stakeholder and Response Policies (P29)
102-43	Approach to stakeholder engagement	<ul style="list-style-type: none"> • Implementation Status of Stakeholder Engagement (P30)
102-44	Key topics and concerns raised	<ul style="list-style-type: none"> • System for Making Use of Customer Feedback in Management (P96) • Dialogue with Employees (P97-98)
6 Reporting Practice		
102-45	Entities included in the consolidated financial statements	<ul style="list-style-type: none"> • Corporate Outline (P140)
102-46	Defining report content and topic boundaries	
102-47	List of material topics	<ul style="list-style-type: none"> • CSR Promotion Items (P25)

102-48	Restatements of information	NA
102-49	Changes in reporting	NA
102-50	Reporting periods	
102-51	Date of most recent report	NGK Report Archive https://www.ngk-insulators.com/en/sustainability/backnumber.html
102-52	Reporting cycle	NGK Report Archive https://www.ngk-insulators.com/en/sustainability/backnumber.html
102-53	Contact point for questions regarding the report	<ul style="list-style-type: none"> • For inquiries about this report (P142) • Inquiries about sustainability https://www.ngk-insulators.com/en/contact/sustainability.html
102-54	Claims of reporting in accordance with the GRI Standards	
102-55	GRI content index	• CSR Data / Content Index (P134)
102-56	External assurance	• Third-Party Assurance (P139)

103 Management Approach

GRI 103: Management Approach 2016

103-1	Explanation of the material topic and its boundary	• CSR Management (P25)
103-2	The management approach and its components	<ul style="list-style-type: none"> • CSR Management (P25) • CSR Promotion Framework (P26) • Targeted Stakeholder and Response Policies (P29) • NGK's Core Policy on the Environment (P31) • Environmental Management Frameworks and Environmental Management System (P32) • Five-Year Environmental Action Plan (P38) • Activities Aimed at Achieving the "Aichi Target" (P49) • Essential Policy, Quality Objective 2018 (P53) • Safety and Health Policy (P61) • Structure of Promote Safety and Health Management (P61) • System to Promote Diversity (P65) • Basic Purchasing Policy (P80) • Supply Chain Management System (P80) • Social Contribution Activity Promotion System (P84) • System for Making Use of Customer Feedback in Management (P96) • Corporate Governance Structure Scheme (P101) • Internal Reporting System (P112) • NGK Group Guidelines for Corporate Behavior (P119) • Compliance Promotion Structure (P119) • Corruption Prevention Structure (P121) • Risk Management System (P127)
103-3	Evaluation of the management approach	• Results of Initiatives within the Five-Year Environmental Action Plan (P39)

200 Economic Performance

GRI 201: Economic Performance 2016

201-1	Direct economic value generated and distributed	<ul style="list-style-type: none"> • At a Glance (P19-20) • Financial and Non-Financial Highlights (P21-22) • Securities Report, Financial Highlights (P2)
201-2	Financial implications and other risks and opportunities due to climate change	<ul style="list-style-type: none"> • Value Creation by the NGK Group (P9-10) • Water Resources Risk Management/Response (P48)
201-3	Defined benefit plan obligations and other retirement plans	
201-4	Financial assistance received from government	

GRI 202: Market Presence 2016		
202-1	Ratios of standard entry level wage by gender compared to local minimum wage	
202-2	Proportion of senior management hired from the local community	
GRI 203: Indirect Economic Impacts 2016		
203-1	Infrastructure investments and services supported	<ul style="list-style-type: none"> • Value Creation by the NGK Group (P9-10) • At a Glance (P19-20)
203-2	Significant indirect economic impacts	
GRI 204: Procurement Practices 2016		
204-1	Proportion of spending on local suppliers	
GRI 205: Anti-Corruption 2016		
205-1	Operations assessed for risks related to corruption	
205-2	Communication and training about anti-corruption policies and procedures	<ul style="list-style-type: none"> • Corruption Prevention Structure (P121)
205-3	Confirmed incidents of corruption and actions taken	NA
GRI 206: Anti-Competitive Behavior 2016		
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	<ul style="list-style-type: none"> • Status of Law and Regulation Violations (P124)

300 Environmental Standards

GRI 301: Materials 2016		
301-1	Materials used by weight or volume	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36)
301-2	Recycled input materials used	
301-3	Reclaimed products and their packaging materials	<ul style="list-style-type: none"> • Five-Year Environmental Action Plan Progress Report>Recycling rate (P39)
GRI 302: Energy 2016		
302-1	Energy consumption within the organization	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36) • INPUT (P37)
302-2	Energy consumption outside of the organization	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36) • OUTPUT (P37)
302-3	Energy intensity	
302-4	Reduction of energy consumption	<ul style="list-style-type: none"> • Five-Year Environmental Action Plan Progress Report (P39)
302-5	Reductions in energy requirements of products and services	
GRI 303: Water and Effluents 2016		
303-1	Water withdrawal by source	<ul style="list-style-type: none"> • P36 Overall Perspective of Environmental Impact
303-2	Water sources significantly affected by withdrawal of water	<ul style="list-style-type: none"> • P48 Water Resource Risk Management/Response
303-3	Water recycled and reused	
GRI 304: Biodiversity 2016		
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	
304-2	Significant impacts of activities, products, and services on biodiversity	
304-3	Habitats protected or restored	

304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	
GRI 305: Emissions 2016		
305-1	Direct (Scope 1) GHG emissions	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36) • OUTPUT (P37)
305-2	Energy indirect (Scope 2) GHG emissions	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36) • OUTPUT (P37) • Introduction of Green Power (P46)
305-3	Other indirect (Scope 3) GHG emissions	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36) • Reporting Scope 3 CO₂ Emissions (P46)
305-4	GHG emissions intensity	<ul style="list-style-type: none"> • Measures to Reduce CO₂ Emissions and Effects (P43)
305-5	Reduction of GHG emissions	<ul style="list-style-type: none"> • Five-Year Environmental Action Plan Progress Report (P39) • Environmental Efficiency (P52)
305-6	Emissions of ozone-depleting substances (ODS)	
305-7	Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions	
GRI 306: Effluents and Waste 2016		
306-1	Water discharge by quality and destination	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36)
306-2	Waste by type and disposal method	<ul style="list-style-type: none"> • Overall Perspective of Environmental Impact (P36)
306-3	Significant spills	NA
306-4	Transport of hazardous waste	
306-5	Water bodies affected by water discharges and/or runoff	
GRI 307: Environmental Compliance 2016		
307-1	Non-compliance with environmental laws and regulations	NA
GRI 308: Supplier Environmental Assessment 2016		
308-1	New suppliers that were screened using environmental criteria	
308-2	Negative environmental impacts in the supply chain and actions taken	

400 Social Standards

GRI 401: Employment 2016		
401-1	New employee hires and employee turnover	<ul style="list-style-type: none"> • Employees>Turnover ratio (P59) • Diversity (P65)
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	<ul style="list-style-type: none"> • Enhancement of Work-Life Balance Systems (P70) • Systems Operated Independently by NGK (P71)
401-3	Parental leave	<ul style="list-style-type: none"> • Systems That Exceed Legal Requirements (P71)
GRI 402: Labor/Management Relations 2016		
402-1	Minimum notice periods regarding operational changes	
GRI 403: Occupational Health and Safety 2016		
403-1	Workers representation in formal joint management–worker health and safety committees	<ul style="list-style-type: none"> • Health and Safety (P61)
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	<ul style="list-style-type: none"> • Work-Related Accidents (P62)
403-3	Workers with high incidence or high risk of diseases related to their occupation	

403-4	Health and safety topics covered in formal agreements with trade unions	
GRI 404: Training and Education 2016		
404-1	Average hours of training per year per employee	<ul style="list-style-type: none"> • Training Participant Summary (P73)
404-2	Programs for upgrading employee skills and transition assistance programs	<ul style="list-style-type: none"> • Promoting Systematic Education through Nearly 120 Programs (P73)
404-3	Percentage of employees receiving regular performance and career development reviews	<ul style="list-style-type: none"> • Measuring Human Resource Development Achievements Using Quantitative Indices (P75)
GRI 405: Diversity and Equal Opportunity 2016		
405-1	Diversity of governance bodies and employees	<ul style="list-style-type: none"> • Diversity (P65-68) • Board of Directors, Audit & Supervisory Board, Executive Officers (P105-106)
405-2	Ratio of basic salary and remuneration of women to men	
GRI 406: Non-Discrimination 2016		
406-1	Incidents of discrimination and corrective actions taken	
GRI 407: Freedom of Association and Collective Bargaining 2016		
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	
GRI 408: Child Labor 2016		
408-1	Operations and suppliers at significant risk for incidents of child labor	<ul style="list-style-type: none"> • Human Rights Initiatives (P78) • Promotion of CSR Procurement (P82)
GRI 409: Forced or Compulsory Labor 2016		
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	<ul style="list-style-type: none"> • Human Rights Initiatives (P78) • Promotion of CSR Procurement (P82)
GRI 410: Security Practices 2016		
410-1	Security personnel trained in human rights policies or procedures	
GRI 411: Rights of Indigenous Peoples 2016		
411-1	Incidents of violations involving rights of indigenous peoples	NA
GRI 412: Human Rights Assessment 2016		
412-1	Operations that have been subject to human rights reviews or impact assessments	
412-2	Employee training on human rights policies or procedures	
412-3	Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	
GRI 413: Local Communities 2016		
413-1	Operations with local community engagement, impact assessments, and development programs	<ul style="list-style-type: none"> • Local Communities (P84)
413-2	Operations with significant actual and potential negative impacts on local communities	
GRI 414: Supplier Social Assessment 2016		
414-1	New suppliers that were screened using social criteria	
414-2	Negative social impacts in the supply chain and actions taken	
GRI 415: Public Policy 2016		
415-1	Political contributions	

GRI 416: Customer Health and Safety 2016		
416-1	Assessment of the health and safety impacts of product and service categories	<ul style="list-style-type: none"> • Development and Provision of Products and Services That Embody Safety and Reliability (P25) • Quality Activity System (P53)
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	NA
GRI 417: Marketing and Labeling 2016		
417-1	Requirements for product and service information and labeling	
417-2	Incidents of non-compliance concerning product and service information and labeling	NA
417-3	Incidents of non-compliance concerning marketing communications	NA
GRI 418: Customer Privacy 2016		
418-1	Substantiated complaints regarding concerning breaches of customer privacy and losses of customer data	<ul style="list-style-type: none"> • Status of Law and Regulation Violations (P124)
GRI 419: Socioeconomic Compliance 2016		
419-1	Non-compliance with laws and regulations in the social and economic area	NA

Independent Practitioner's Assurance

Deloitte.

デロイト トーマツ

(TRANSLATION)

Independent Practitioner's Assurance Report

July 17, 2018

Mr. Taku Oshima,
President,
NGK Insulators, Ltd.

Masahiko Sugiyama
Representative Director
Deloitte Tohmatsu Sustainability Co., Ltd.
3-3-1, Marunouchi, Chiyoda-ku, Tokyo

We have undertaken a limited assurance engagement of the energy-origin CO₂ emissions on a non-consolidated basis on page 36 (the "CO₂ Information") for the year ended March 31, 2018 included in the "NGK Sustainability Data Book 2018(PDF version)" (the "Report") of NGK Insulators, Ltd. (the "Company").

The Company's Responsibility

The Company is responsible for the preparation of the CO₂ Information in accordance with the calculation and reporting standard adopted by the Company (pages 36 and 37 in the Report). CO₂ quantification is subject to inherent uncertainty for reasons such as incomplete scientific knowledge used to determine emissions factors and numerical data.

Our Independence and Quality Control

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. We apply International Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements*, and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the CO₂ Information based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements ("ISAE") 3000, *Assurance Engagements Other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board ("IAASB"), ISAE 3410, *Assurance Engagements on Greenhouse Gas Statements*, issued by the IAASB and the *Practical Guideline for the Assurance of Sustainability Information*, issued by the Japanese Association of Assurance Organizations for Sustainability Information.

The procedures we performed were based on our professional judgment and included inquiries, observation of processes performed, inspection of documents, analytical procedures, evaluating the appropriateness of quantification methods and reporting policies, and agreeing or reconciling with underlying records. These procedures also included the following:

- Evaluating whether the Company's methods for estimates are appropriate and had been consistently applied. However, our procedures did not include testing the data on which the estimates are based or reperforming the estimates.
- Undertaking site visits to assess the completeness of the data, data collection methods, source data and relevant assumptions applicable to the sites.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

Limited Assurance Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Company's CO₂ Information is not prepared, in all material respects, in accordance with the calculation and reporting standard adopted by the Company.

The above represents a translation, for convenience only, of the original Independent Practitioner's Assurance report issued in the Japanese language.

Member of
Deloitte Touche Tohmatsu Limited

Corporate Outline and Organization

Corporate Outline

Company name	NGK Insulators, Ltd.	Consolidated subsidiaries	58 consolidated subsidiaries (21 in Japan, 14 in North/Central America, 7 in Europe, 16 in Asia and elsewhere)
Address	2-56 Suda-cho, Mizuho, Nagoya 467-8530, Japan Telephone + (81) 52-872-7181	Equity-method affiliates	2
Established	May 5, 1919	Employees	NGK 4,142 (as of March 31, 2018) Consolidated 18,783 (as of March 31, 2018)
Paid-in capital	69.8 billion yen (as of March 31, 2018)		
Net sales	451.1 billion yen (consolidated, for FY2017)		

Organization

Head Office

- Auditing Department
- Quality Management Department
- Environmental Management Department
- Safety & Industrial Health Management Department
- Corporate Planning Office
- New Business Planning Office
- Secretarial Office
- Corporate Communications Department
- Human Resources Department
- Group Compliance Department
- Finance & Accounting Department
- Legal Department
- Intellectual Property Department
- General Affairs Department
- Purchasing Department

Corporate R&D

- Business Planning Department
- Wafer Project
- NCM Project
- Functional Materials Development Project
- SOFC Project
- ZNB Project
- ACB Project
- Materials Research Laboratory
- Future Technology Management Center

Corporate Manufacturing Engineering

- Administration Department
- Manufacturing Engineering Department
- Information Technology Department
- Construction & Maintenance Department
- Global Engineering Department

Power Business Group

- Business Planning Department
- Quality Assurance Department
- Sales & Marketing Division
- Insulator Division
- NAS Battery Division

Ceramic Products Business Group

- Business Planning Department
- Quality Assurance Department
- Global Sales & Marketing Division
- Engineering Division
- Manufacturing Division
- Sensor Division

Electronics Business Group

- Business Planning Department
- Quality Assurance Department
- New Business Promotion Project
- New Metals Division
- Electronic Components Division

Process Technology Business Group

- Business Planning Department
- Quality Assurance Department
- High Performance Ceramics Division
- Industrial Process Division

Subsidiaries and Affiliated Companies

Sites, Main Office, Branch, Sales Offices

Nagoya Site/Tokyo Main Office/Osaka Branch/Chita Site/Komaki Site/Ishikawa Plant/
Sapporo Sales Office/Sendai Sales Office/Hokuriku Sales Office/Hiroshima Sales Office/
Takamatsu Sales Office/Fukuoka Sales Office

Group Companies in Japan

Energy Support Corporation/Akechi Insulators, Ltd./NGK Okhotsk, Ltd./NGK Metex Corporation/
NGK Fine Molds, Ltd./NGK Ceramic Device Co., Ltd./NGK Electronics Devices, Inc./Soshin Electric Co., Ltd./Soshin
Device Co., Ltd./Soshin Powertech Co., Ltd./Risshin Electronics Co., Ltd./Ikebukuro Horo Kogyo Co., Ltd./NGK
Chem-Tech, Ltd./NGK Filtech, Ltd./NGK Adrec Co., Ltd./NGK Kilntech Corporation/NGK Sports Planning Co.,
Ltd./NGK Life Co., Ltd./NGK Yu-Service Co., Ltd./NGK Logistics, Ltd.

Group Companies Overseas

America

NGK-Locke Inc./NGK-Locke Polymer Insulators, Inc./
NGK Ceramics USA, Inc./NGK Automotive Ceramics USA, Inc./
NGK Ceramics Mexico, S. de R.L. de C.V./NGK Metals Corporation/
NGK Insulators of Canada, Ltd./FM Industries, Inc./
NGK Electronics USA, Inc./Soshin Electronics of America Inc.

Europe, Africa

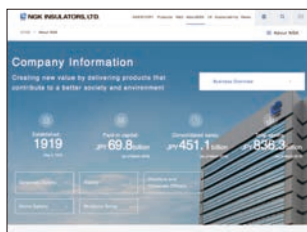
NGK Berylco U.K. Ltd./NGK Ceramics Europe S.A./
NGK Europe GmbH/NGK Deutsche Berylco GmbH/
NGK Berylco France/NGK Ceramics Polska Sp. z o.o./
NGK Ceramics South Africa (Pty) Ltd.

Asia, Oceania

NGK Insulators Tangshan Co., Ltd.
NGK Insulators (China) Investment Co., Ltd.
NGK Ceramics Suzhou Co., Ltd.
NGK Technocera Suzhou Co., Ltd.
NGK Automotive Ceramics Korea Co., Ltd.
P.T. NGK Ceramics Indonesia
Siam NGK Technocera Co., Ltd.
NGK Ceramics (Thailand) Co., Ltd.
NGK Technologies India Pvt. Ltd.
NGK Stanger Pty. Ltd.

Details of NGK are available on the company website

The NGK Sustainability Data Book 2018 reports on the NGK Group's sustainability initiatives. Additional sustainability, corporate, and investor relations information is available on the NGK website.



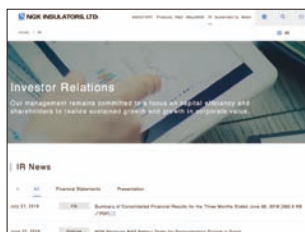
About NGK

[English]

<https://www.ngk-insulators.com/en/info/>

[Japanese]

<https://www.ngk.co.jp/info/>



Investor Relations

[English]

<https://www.ngk-insulators.com/en/ir/>

[Japanese]

<https://www.ngk.co.jp/ir/>



Sustainability

[English]

<https://www.ngk-insulators.com/en/sustainability/>

[Japanese]

<https://www.ngk.co.jp/sustainability/>



External Evaluation

In September 2017, NGK was selected for the second consecutive year for the Dow Jones Sustainability Asia Pacific Index in the Dow Jones Sustainability Indices, a major index for socially responsible investment.

MEMBER OF
**Dow Jones
Sustainability Indices**
In Collaboration with RobecoSAM



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Ink: To replace petroleum-based inks, vegetable-based inks with the volatile organic compounds (VOCs) content reduced to below 1% have been employed.

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